Intensive Agriculture

JUNE-JULY, 1963

OFFICE OF THE PRINCIPAL, RURAL EXTENSION ... KALLUPATTI
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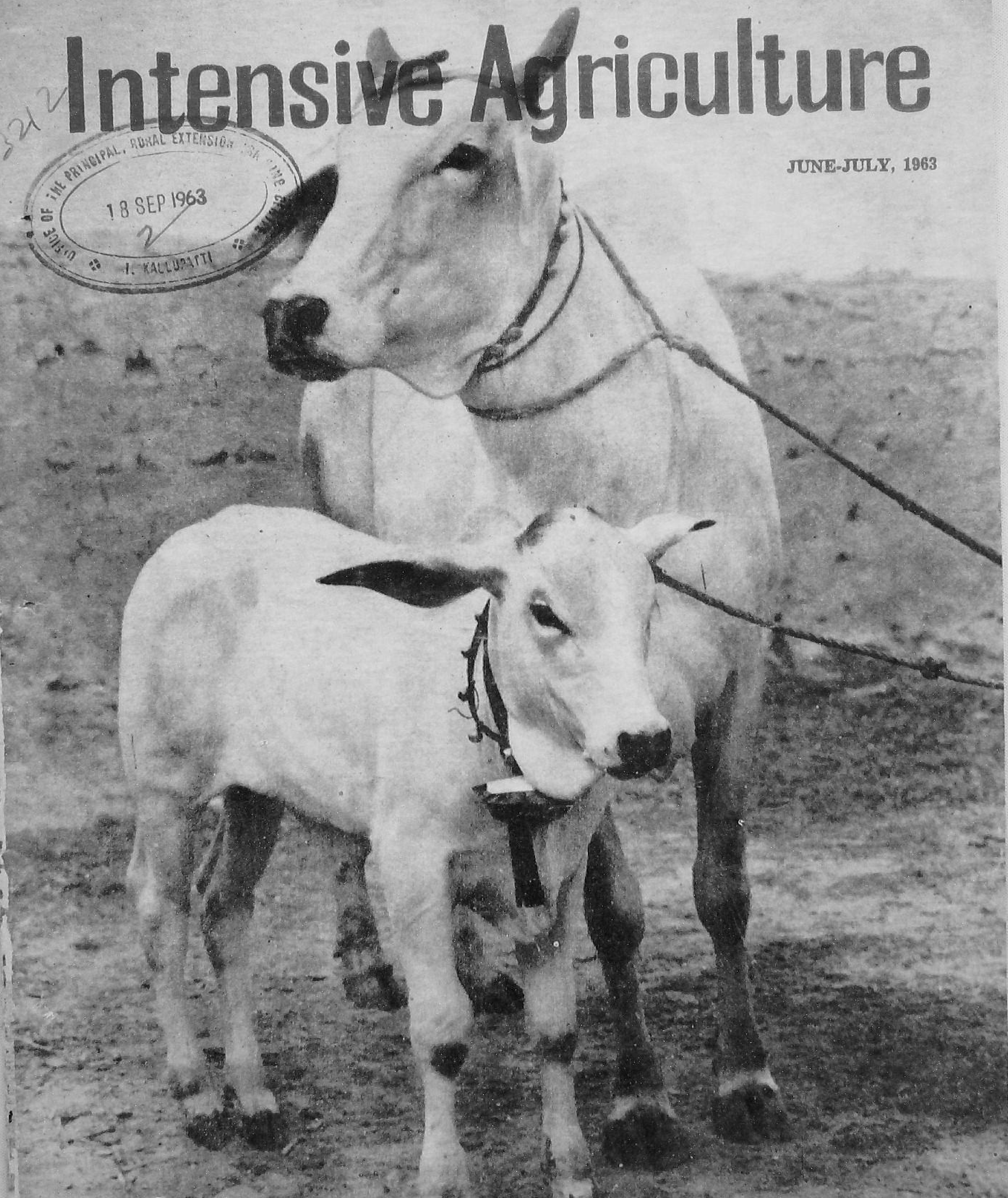

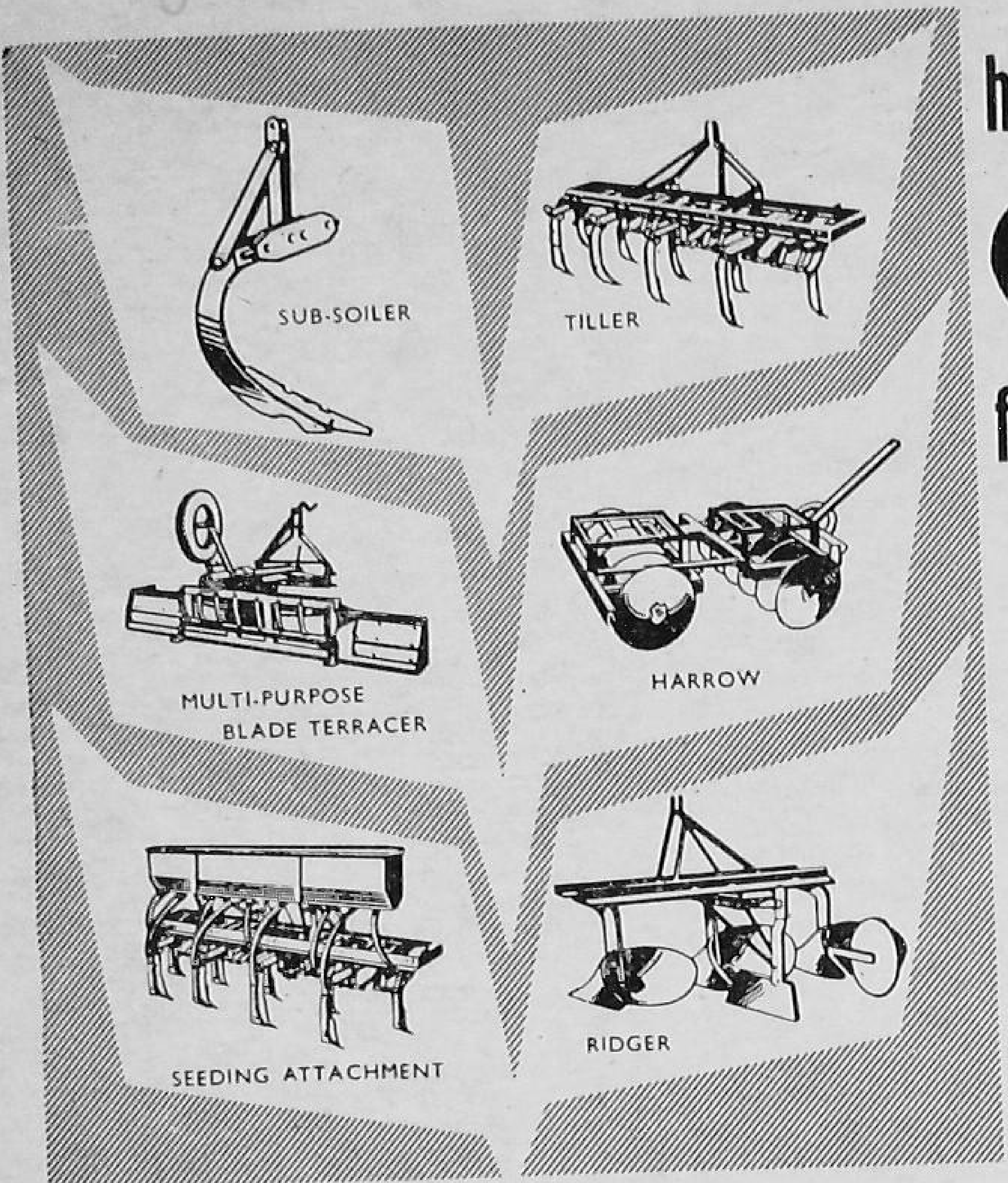

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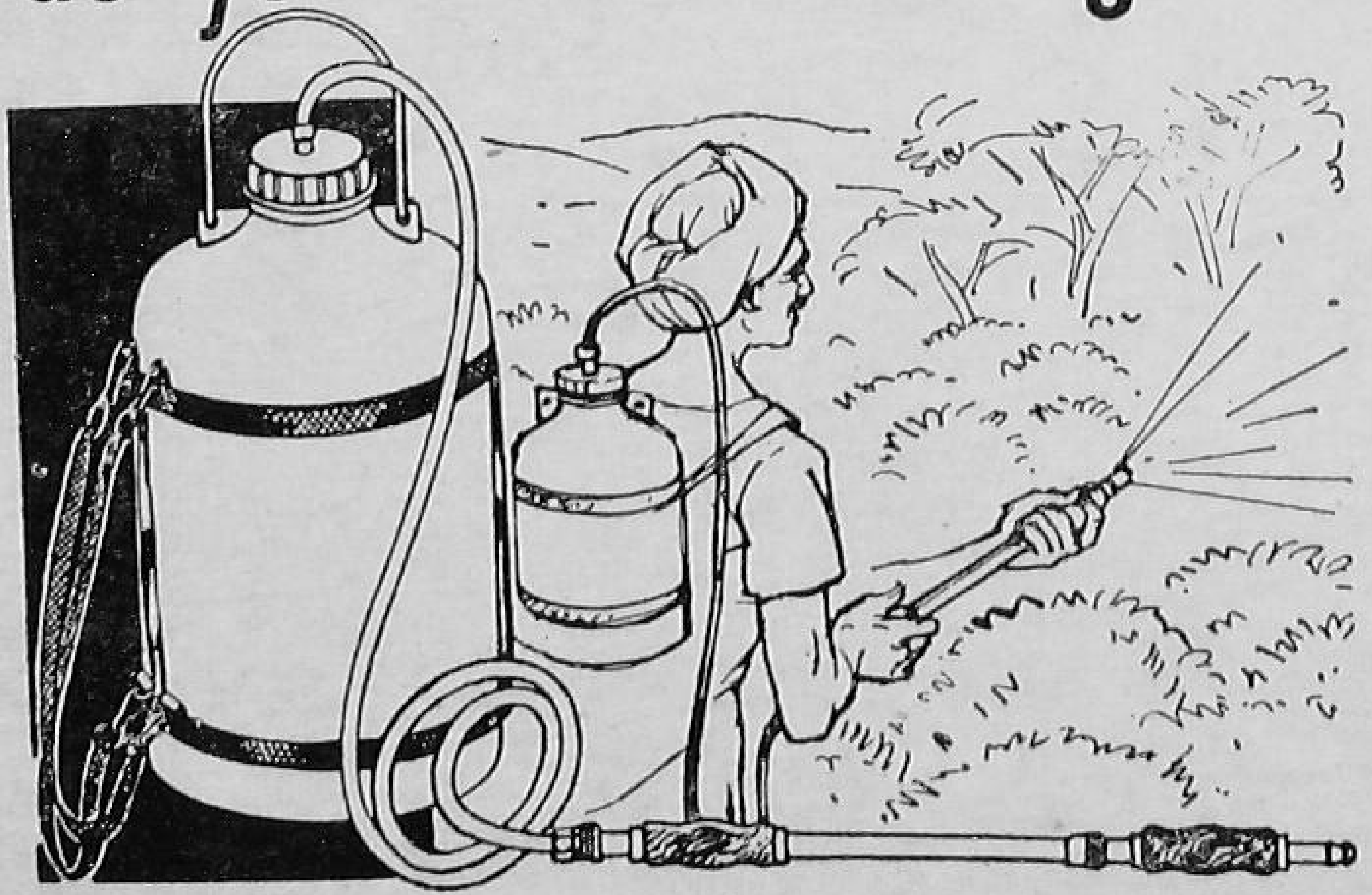

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Intensive Agriculture

VOL. 1 JUNE-JULY 1963 Nos. 4 & 5

THE PICTURE ON THE COVER

Prize-winners both. No wonder the calf and its mother are the pride of Jhanjeri village. For full story, *turn to page 23*

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CONTENTS

The new venture started with a bang 2
Treat seed now to save 'trouble' later 4
Let trees solve your fuel problem 5
The rat ! 6
A cutting is born and bred 7
Sesbania manures the second rice crop too .. 13
The French bean that came from America .. 14
Forestry cooperatives 15
Lobia should find a place in every farm .. 16
Here is something new in silk cotton 18
A new seed-drill for sowing wheat 21
None could beat his cow and calf in the rally 23
The *Hansa* milk test 24
Green manure coconut palms with glyricidia .. 25
Still leaving the wheat land fallow in *kharif* ? 26
West Godavari farmers hail Package Programme 28

Farmer Samey Singh listens to Extension Training Officer S. L. Sharma giving tips on grape cultivation

THE NEW VENTURE STARTED WITH A BANG

By R. C. VATS

'AN OLD farmer with a new mind'—that is the impression you get when you talk to Thakur Samey Singh of Daryapur in Saharanpur District in Uttar Pradesh. At the age of fifty-five, Samey Singh is eager to know about new things and has the courage to try them out in practice.

Daryapur is half a mile's walk from the Sona Railway Station, and is six miles from the headquarters of the Rampur Block. The village is frequently visited by the Block officials and the instructors and trainees of the Gram Sevak Training Centre, Rampur. And so it was that one afternoon in March, three year ago, Samey Singh saw Extension Training Officer S. L. Sharma coming up at a quick pace from the direction of the railway station. What it was that brought him, Samey Singh wondered as he waited to receive the visitor.

STARTLING SUGGESTION

And the matter was startling enough for Thakur Samey Singh. Sharma had come to ask him to start grape cultivation. For some moments Samey Singh stood gaping in surprise. "Why, it is the first time any one talked of such a thing to me. I have eaten grapes many times and have brought some for the children from Saharanpur. But not even in my dreams have I thought of growing them myself. And as you know, no one here in the whole area has ever grown grapes," Samey Sinh spoke out, still amazed.

"Let us sit down over there and talk," suggested Sharma.

A long discussion followed. Sharma explained at length about the research work done at the Government Garden, Saharanpur. The research workers were all agreed that grape cultivation could be a success in this area. He described the simple cultural operations that were needed for grape in this area, and showed by calculation how big an income grape cultivation could bring.

There was one big question in Samey Singh's mind, apart from the newness of the venture. It was the drainage problem. Only two years ago, Samey Singh's one-acre orchard of plum and loquat had been a failure due to seepage of subsoil water.

"I have considered all that," said Sharma, "and have thought out the solution too. You raise the

A view of Samey Singh's half-acre grape orchard, which gives an income of Rs. 2,000 a year

grape orchard on that ½-acre plot on the outskirts of the village. It is on a high-lying, area, and its soil is clayey loam." Sharma promised his advice on every detail in advance, and so the matter was decided.

CAREFUL START

The field was prepared well by repeated ploughings. In April, planting pits, measuring two feet by two feet by two feet, were dug at a distance of ten feet by ten feet. The pits were filled up with top-soil and cow-dung manure at the rate of 20 seers per pit.

Samey Singh purchased the planting material from the Government Garden, Saharanpur. He got sprouted cuttings of the seeded variety *R. S. L. Saharanpur 1*, at 50 nP per cutting. The planting was done in July 1960. The orchard was irrigated at fortnightly intervals, using the flood method. Two shallow intercultivations were given with *phawla* and *khurpa*, leaving space near the vines to avoid root injury.

There was another thing which Samey Singh did on Sharma's advice. He sowed berseem in the space between the rows of vines. This provided good, succulent fodder for cattle and also enriched the orchard soil. Berseem was sown in October, and four cuttings of fodder were taken every year.

One year after planting, trellis was provided for the trailing of vines. Six-foot high bamboo poles were fixed between the vines in the rows, and four parallel wires fixed horizontally on the bamboos.

And then finally came the crop last year. With hope and fear Samey Singh watched the berries forming, growing and ripening on the vines. Bunches of ripe grapes hung from the vines on the trellis. News spread fast, and fellow-farmers and relatives came from far and near to see Thakur Samey Singh's grape orchard. Each visitor was given a bunch of ripe grapes to eat. And the generous host was still left with a part of the crop which was sold in the Saharanpur market for Rs. 300.

Asked about the special problems which he faced in these first three years of grape cultivation, Samey Singh replied that no special problems had been there. Sparrows and wasps, of course, became a problem as the berries started ripening. "This time, I have treated them also as guests, but not so in future. Sharmaji has advised me to use alkathene bags on the ripen-bunches," added Samey Singh with a hearty laugh.

GOOD INCOME

Samey Singh has a reason to be gay. His bold venture, the first ever undertaken in the area, has been a success. He invested in all Rs. 325—Rs. 125 on the planting material and Rs. 200 on the construction of trellis. This year's crop is extremely good, and he hopes to sell grapes worth about Rs. 2,000. And that from a plot of just half an acre.

TREAT SEED NOW TO SAVE 'TROUBLE' LATER

By
D. B. REDDY
Plant Protection Specialist
Directorate of Extension
New Delhi

IT IS not always necessary that all the troubles with which a crop is bothered should come from outside; the seed itself can carry agents which bring in a lot of trouble in the form of diseases in a crop's life.

These trouble-causing agents are actually the disease-producing germs which live on or inside a seed.

These agents either destroy the seed before it can germinate or damage the seedling it gives birth to. Also, in some cases, they neither affect the seed nor the seedlings but only affect the seed-formation. And then there are so many others which remain in the soil and attack the seed when sown.

All these troubles can be avoided by the selection of good seeds and treating them before sowing.

The seed-treatment kills the disease causing-agents present on or inside the seed and also protects the seed, when sown, from the attack of soil-borne diseases.

Hence, if you have not already treated your wheat and barley seed, it is time you did it.

In the northern plains, wheat and barley seed should be subjected to the solar-heat treatment against loose smut. Soak wheat and barley grains kept for seed purposes in ordinary water for four hours (say, from 8 a.m. to 12 a.m.) on any sunny day in May or June. Then remove the seed from the water and spread it out in the sun in a thin layer on a *pucca* floor so that the seed dries up properly. Where the temperatures are not high during May and June, give the hot-water treatment.

Where the earcockle disease is known to occur, treat the wheat seed by 'floatation method.' When the seed is placed in water, the earcockle-affected seeds and the other bad ones will float on the surface. Remove these floating seeds immediately and burn. Drain out the water, and take out the sound seeds which settle at the bottom and dry them as in the solar-treatment.

The initial attacks of foot rot, helminthosporium and blast diseases of rice can be prevented to a large extent by treating the seed before sowing with a mercurial seed-dresser at one part of the chemical to 400 parts of seed by weight.

Grain smut of *jowar* can be very effectively controlled by treating the seed before sowing with a fine powder of sulphur. Use one part of sulphur to 250 parts of seed. You can treat with a mercurial seed-dresser at one part to 400 parts of seed by weight, instead.

Anthracnose of cotton can be minimised by treating the cotton seed with a mercurial seed-dresser at one part of the chemical to 350 parts of seed by weight.

Collar rot and root rot of groundnut are less severe when the seed is treated before sowing with a mercurial seed-dresser at one part to 400 parts of seed, by weight.

Leaf-blight of maize can to some extent be avoided by treating the seed before sowing with a mercurial seed-dresser at one part of the chemical in 400 parts of seed by weight. Jute and mesta also suffer less from stem rot when the seed is treated with a mercurial seed-dresser at one part of the chemical in 320 parts of seed, by weight.

Remember, the mercurial seed-dresser recommended is an organo-mercurial compound containing one per cent active material. These seed-dressers are poisonous and hence should be handled with great care. The seed treated with the seed-dresser left unused should neither be consumed nor fed to cattle, and should be used only for sowing purposes.

The seed should be treated in a seed-treating machine or in a *ghara* or *chatti* if the quantity of seed is small. The *ghara* or *chatti* used for the seed treatment should not be used for any other purposes.

Treating seed may mean a little more labour for you, but it always saves you from a lot of trouble later.

LET TREES SOLVE YOUR FUEL PROBLEM

The planting of fuel trees alone will help farmers solve their fuel problem, and save valuable cowdung from being burnt away, and thus saving it for manuring the fields.

A ten-year old casuarina grove on an acre of land, for example, can yield 40 tons of fuel, enough for 50 families for a whole year. The fuel needs of an entire village of 100 families or 500 persons can be met by putting 20 acres under casuarina at the rate of two acres per year.

There are many trees which are not as fast growing as casuarina, Eucalyptus or *Acacia millisima*, but still yield large quantities of good fuel. Some of these, which a farmer can raise easily in his fields or on bunds and borders or in groves, are *babul, neem,* mesquite, *karanj, haldu, sissoo, jamun,* and some cassias.

The rainy season is the most suitable time for planting fuel trees. Seeds or seedlings of these trees are available to farmers from either the District Forest Officers or N.E.S. Blocks.

The RAT!

The rat problem is everywhere. Here is what farmers of Package District of Thanjavur are doing about it.

THE BANDICOOTE and the grass rat are the two most important types of rats that damage crops in the IADP District of Thanjavur.

This has been seen at the Agricultural Research Station at Aduthurai in the District. The bandicoote does most harm to the *samba* (mid-season) and *thaladi* (late season) paddy crops, and the grass rat to the *kurvai* (early season) crop.

Rat-breeding was found to coincide with the maturity of the paddy crop, and rats were found active when ears were in the milky stage. It appeared that there were four broods a year, the first from middle of September to October, the second in December-January, the third in March and the fourth in June-July.

A litter of rats consisted of 8 to 12 young ones, the number sometimes going up to 14.

Observations also showed that the young rat did not move out of the litter-burrow for the first fortnight. It took another fortnight to grow up and come out of the burrow for feeding. It matured after another three weeks.

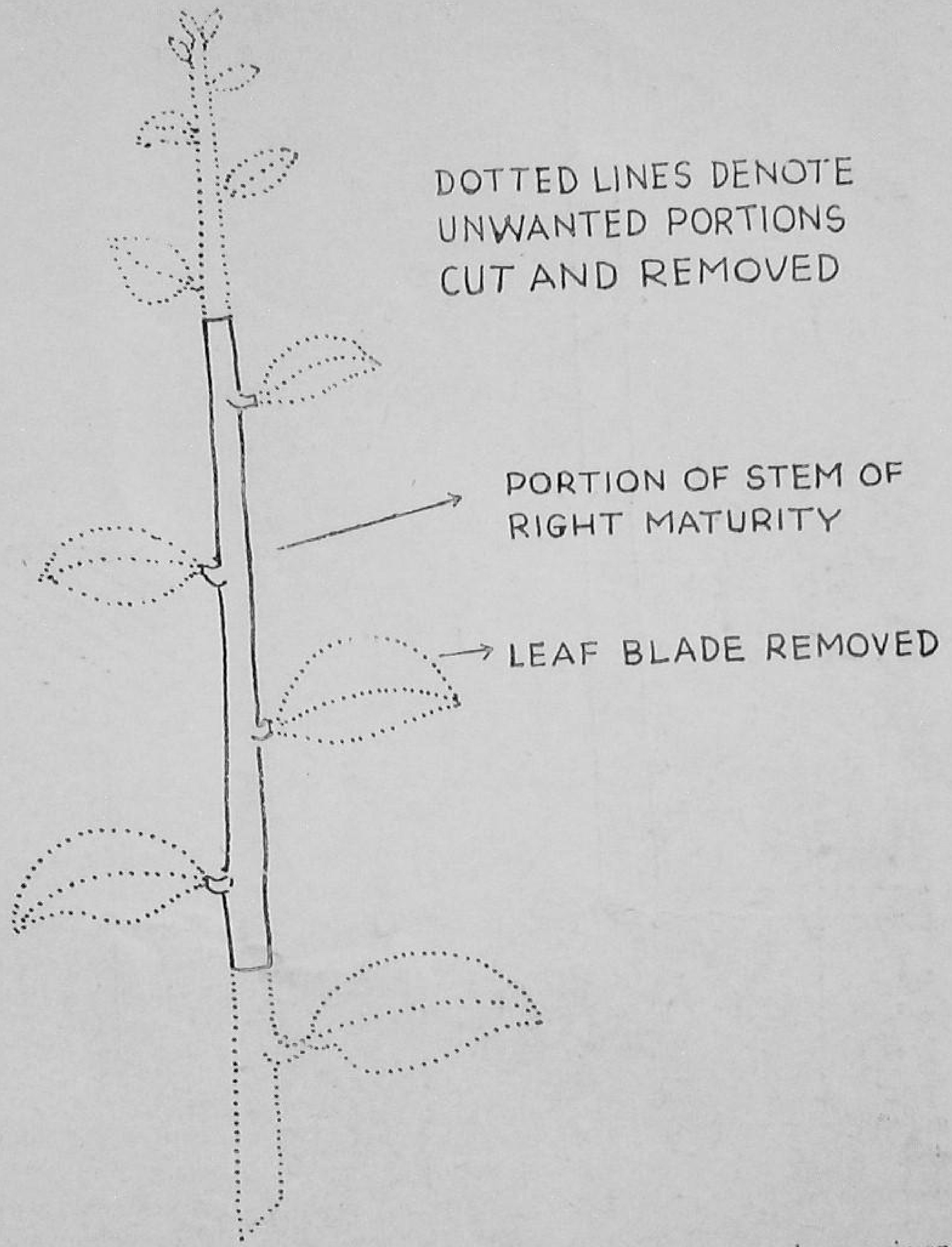
Each full-grown rat was found to consume about 22 grams of paddy per day. The order of preference for feeding was paddy, green gram, groundnut and black-gram.

A rat gallery could be, on an average, 15 feet long and $1\frac{1}{2}$ feet deep, with half a dozen store houses and five exits.

Observations in the field showed that 1 to 2 kilograms of paddy were stored in a litter-burrow, and $\frac{1}{4}$ to $\frac{1}{2}$ kilogram of paddy near the exit. A female rat was found to hoard 11 to 16 kilograms of paddy for the feeding of her young ones.

The rat population in an acre of field varies from 15 to 40 or 50. Digging the rats out from paddy bunds was the common method of control followed by the farmers. Two men can dig out the bunds of 1 to $1\frac{1}{2}$ acres in a day, and kill 80 to 100 rats.

a CUTTING is born and bred . . .



New scientific facts are helping nurseryman successfully raise cuttings of fruit and ornamental plants

By
S. RAMA KRISHNAN

MULTIPLYING p'ants by cuttings is now the most established practice among nurserymen and garden-owners. This way, they get true-to-type plants easily.

Not all plants can be raised by cuttings; nor are cuttings taken from just any one part of the plant. In some plants, parts of the leaf, and in some others of roots give rise to new plants.

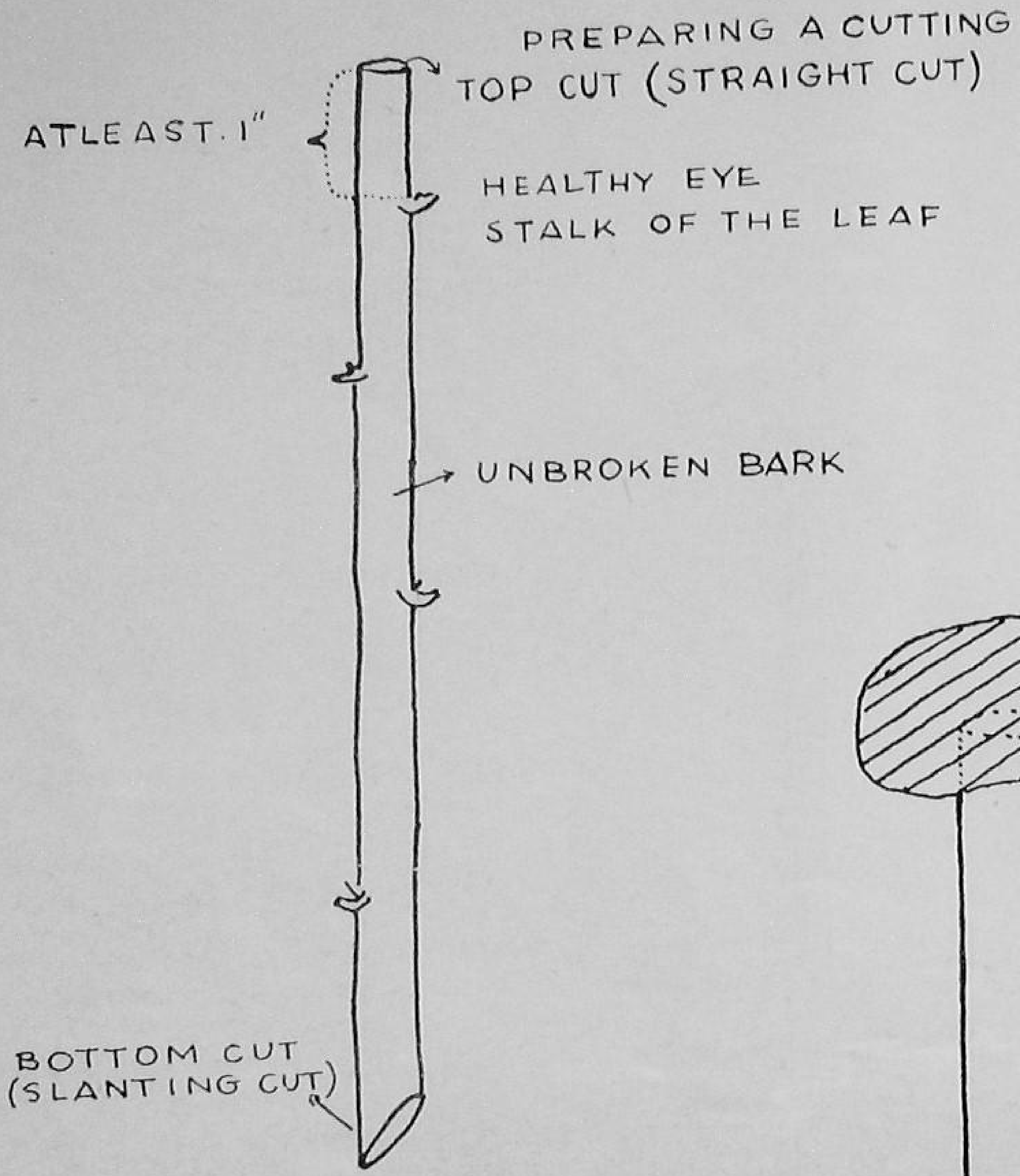
A lot of scientific observations and experiments made tell us of new facts about how to prepare cuttings, plant them and take care of them, to get the best results.

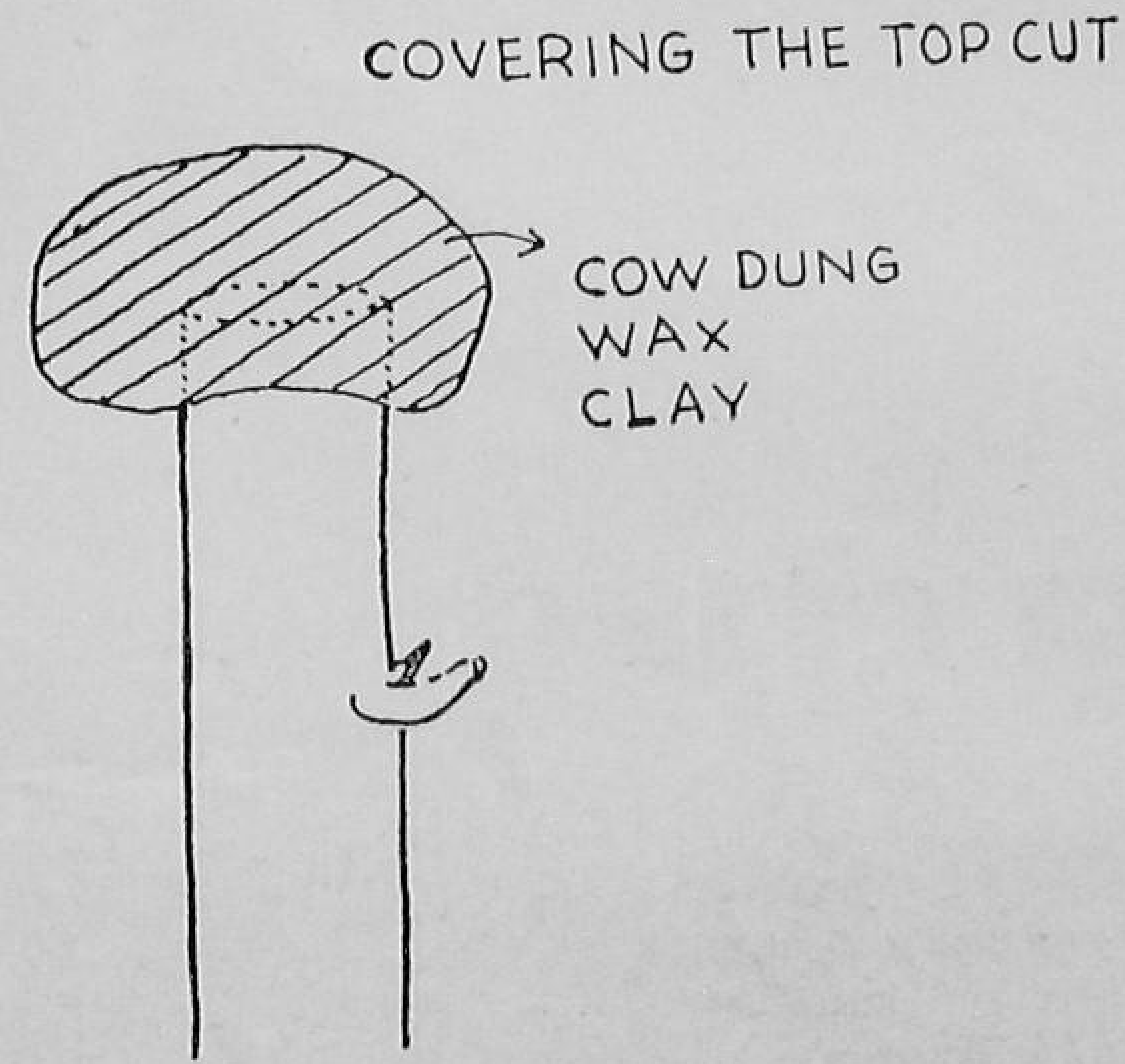
These facts should be known by all nurserymen and garden-owners, so that their labours are rewarded well.

TIME FOR TAKING CUTTINGS

Parts meant for cuttings should have buds or 'eyes' capable of growing into branches. Therefore, the best time for you to take out cuttings would be a growing season, and not a fruiting or a dormant season.

In most cases, success in rooting the cuttings depends much upon their maturity. The age of growth of the part used as cutting denotes the maturity. But it is





mostly decided by the hardiness of the wood-part of the stem. Maturity in cuttings varies from immature tip-portions to hard-wood limbs of various plants. Mature cuttings are usually pencil-thick in size and possess an amber colour.

HOW LONG SHOULD BE THE CUTTING

In the case of leaf-cuttings, the whole leaf as such is used. In the case of root and stem cuttings the length varies, depending upon the maturity of the parts, number of nodes they possess and the availability of materials. But in general, a length of nine inches is the best for stem-cuttings.

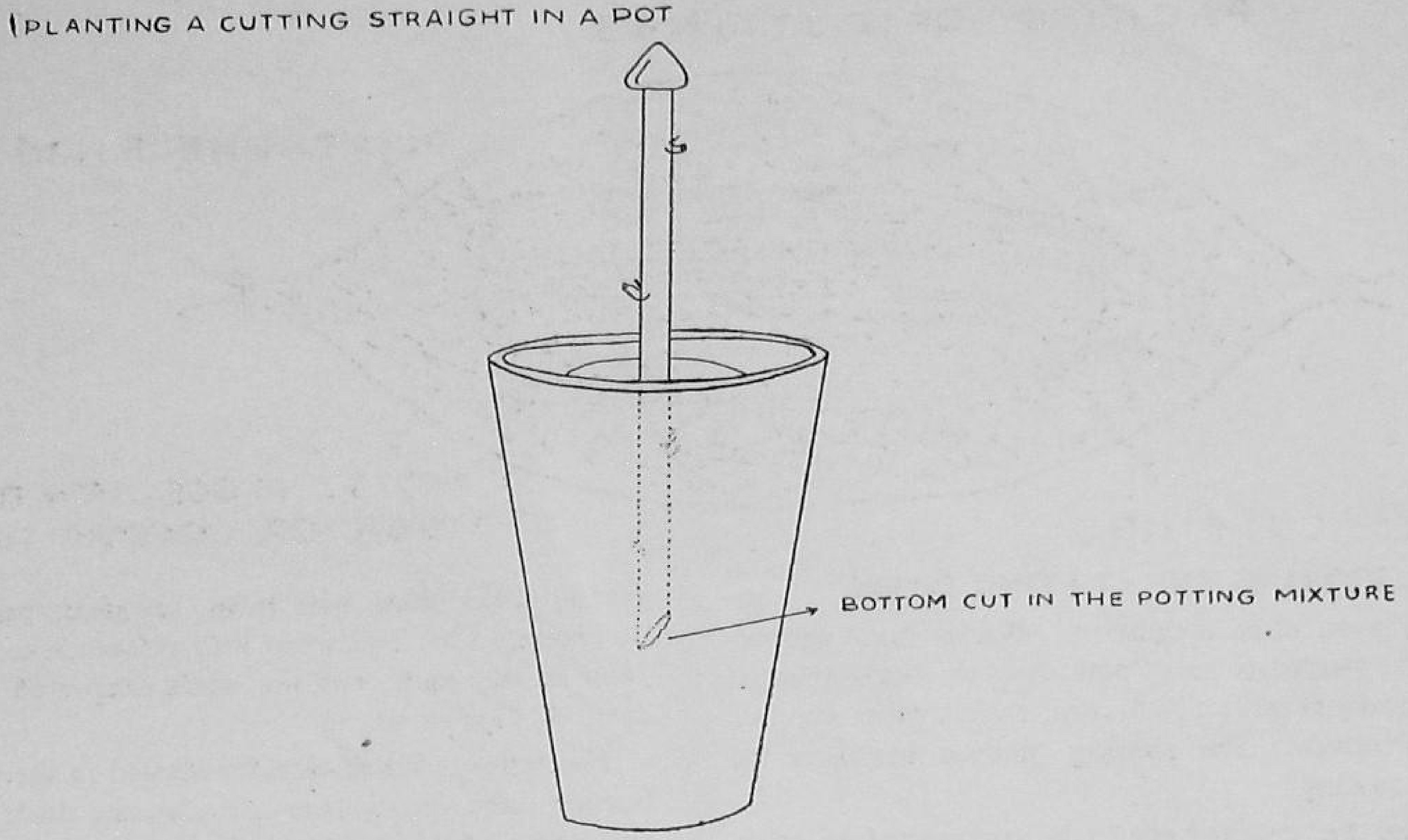
NODES ARE IMPORTANT TOO

A cutting must have at least four nodes with healthy buds or 'eyes' of vigorous growing nature, so that if one of them gets buried in the soil at the time of planting, there will be at least two or more in the aerial part of the cutting to grow into stems of the young plant. In fact, there should be one node below the ground and two or three nodes above the surface of the ground while planting.

In the case of certain kinds of fruits, vegetables and spices the stem portions are modified into store-houses of prepared food materials, having modified leaves and buds, as in the case of pineapple, elephant yam, colocasia, potato, ginger and turmeric. While preparing cuttings in such cases see to it that all the pieces possess at least two to four buds or eyes in each.

THE BARK INTACT

The bark of the stem and root-cuttings must be quite healthy besides being unpeeled or unbroken throughout its area. The peeled part, if any, may lodge insects and disease-germs and will damage the whole cutting.



THE TOP CUT

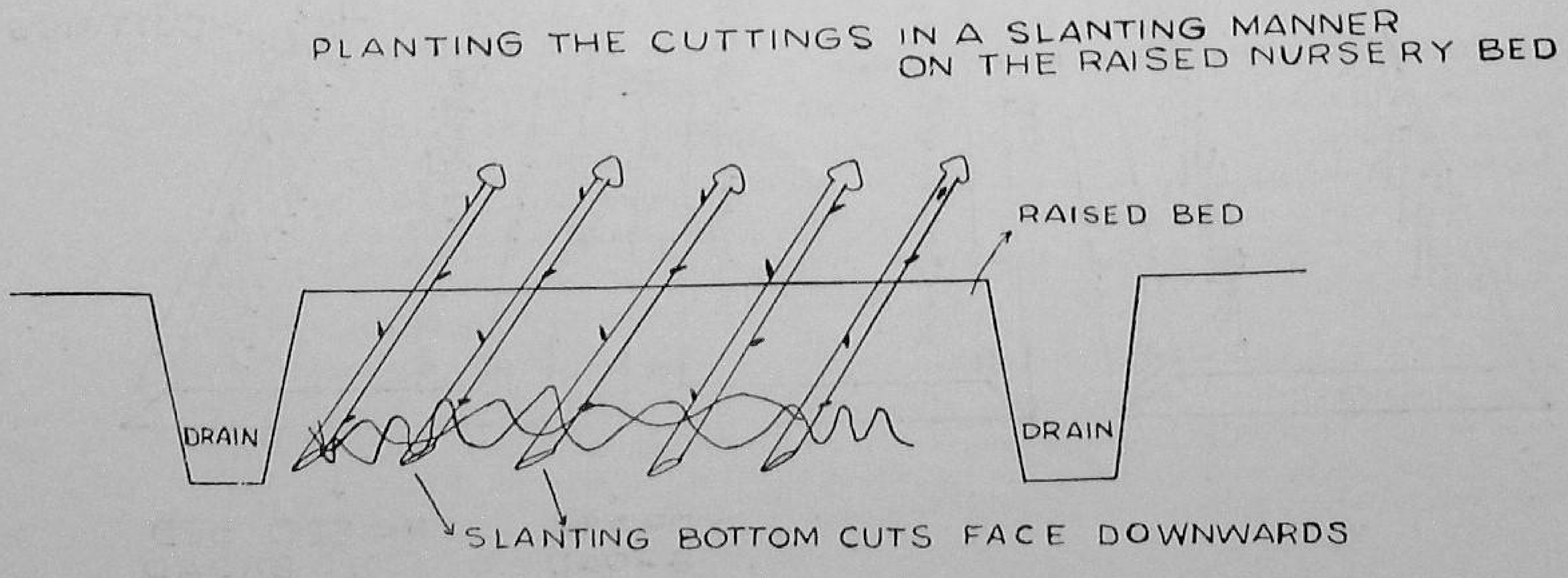
The top cut of the stem-cutting must be at least one inch above the top node, so that even if the tip begins to dry up downwards, the bud at the top node would be saved from casualty. Again, the top cut you give must be a straight and smooth one, so that there will be minimum evaporation loss and quick healing due to reduced wound surface with practically no undulations to lodge disease-germs.

THE BOTTOM CUT

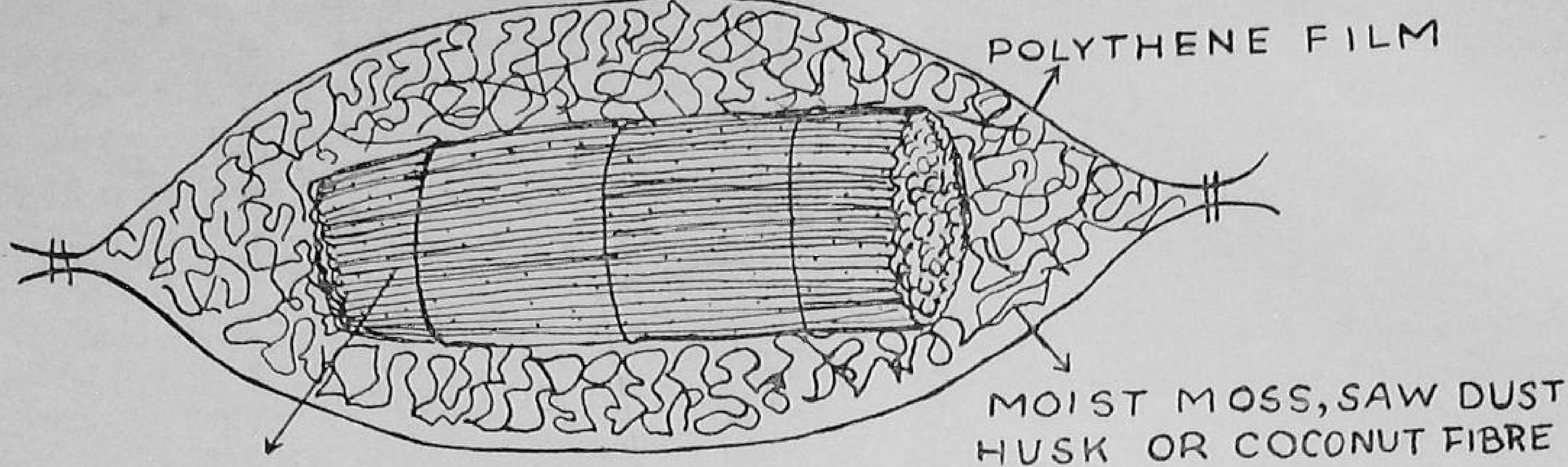
The bottom cut of a stem or root-cutting must be a standing one starting from on side of the bark and ending on the opposite side of the bark and run through the wood of the cutting slantingly and smoothly. The slanting cut will expose more of root-forming layers and increase the chances for greater number of roots and decrease the chances of their competition for space and nutrients.

CUTS NEED CARE

Protect the top cut of the stem-cutting with cow-dung, clay, wax or polythene-wrapper. The last two are the best as they effectively prevent evaporation loss from the cutting.



PACKING OF CUTTINGS



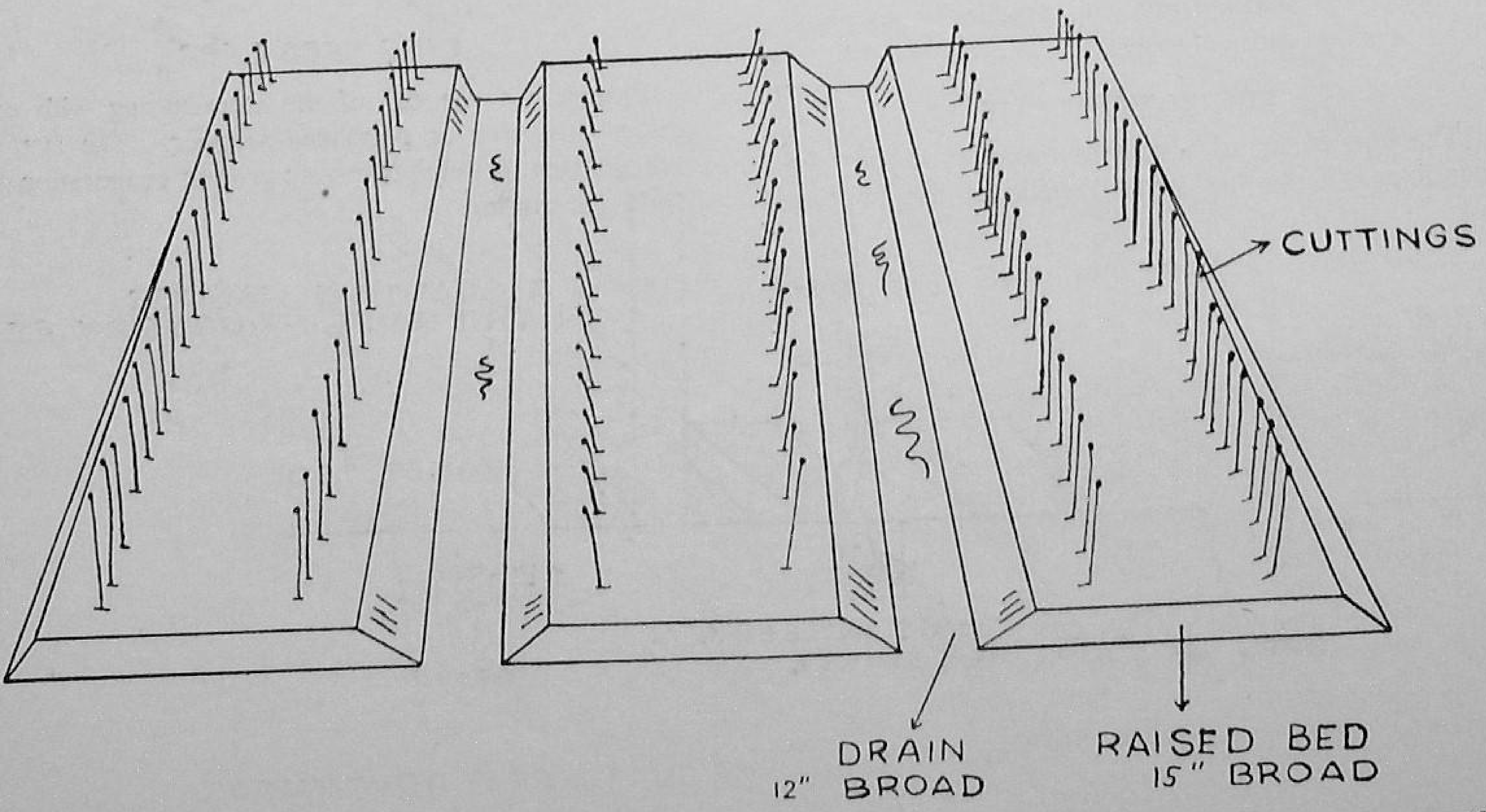
PUTTING THE CUTTING DOWN

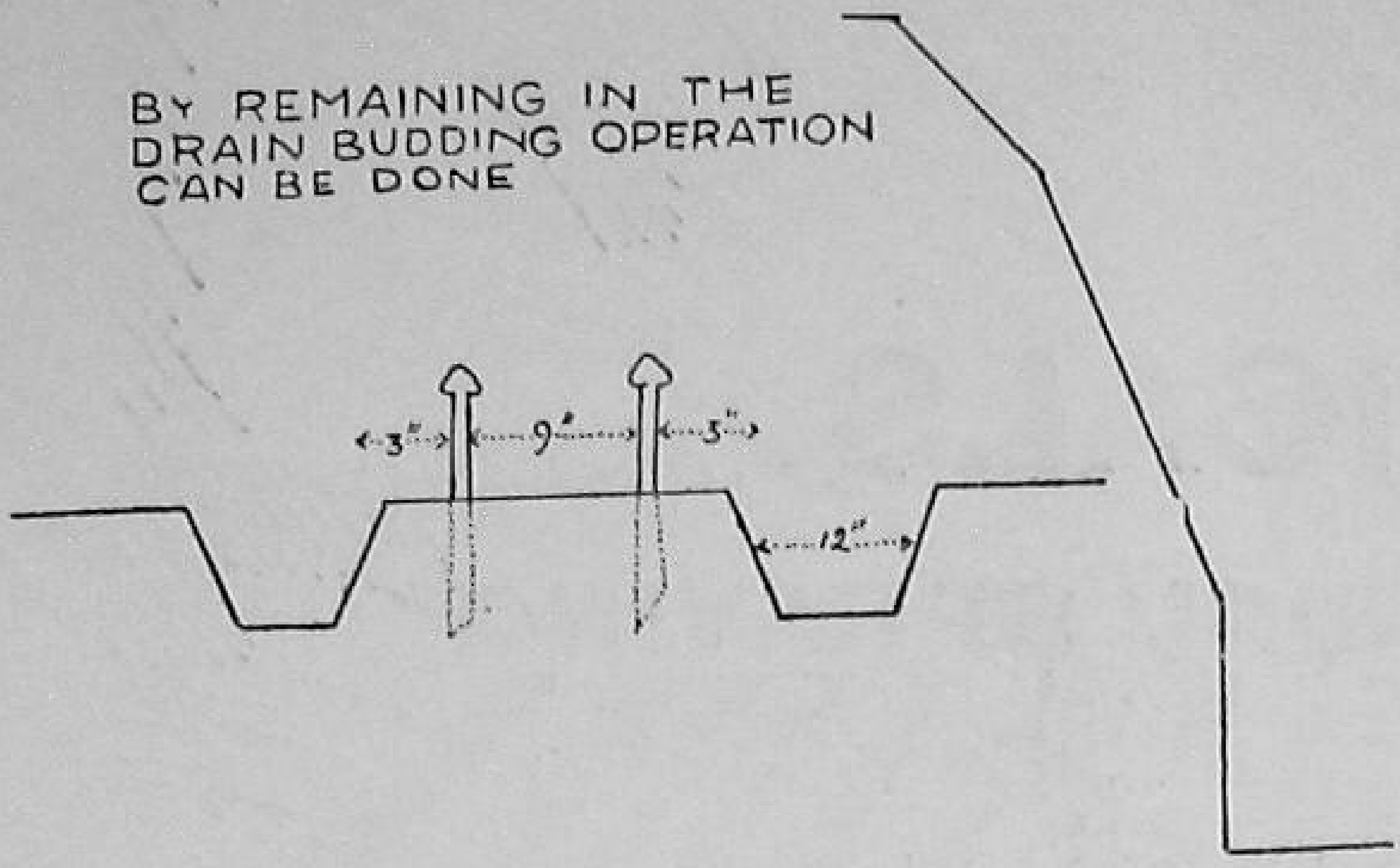
Plant soon after separation. Unless the cuttings are to be planted in small pots, they are better planted in a slanting manner (30°) with their bottom cut facing downwards. The slanting position increases the area of rooting.

In case the cuttings are to be transported to other places, cover them with moss, saw-dust, paddy husk or coconut fibre and wrap with polyethelene film. But even in this pack, cuttings won't keep well for more than 10 days or so.

The cuttings should first be planted in the nurseries. Because here you can provide adequate shade, manure and water which is essential for success. But the

CUTTINGS PLANTED FOR ROOTSTOCK PURPOSES





limb-cuttings or the longer cuttings as in the case of drumstick can go directly in the planting pits marked in the orchard.

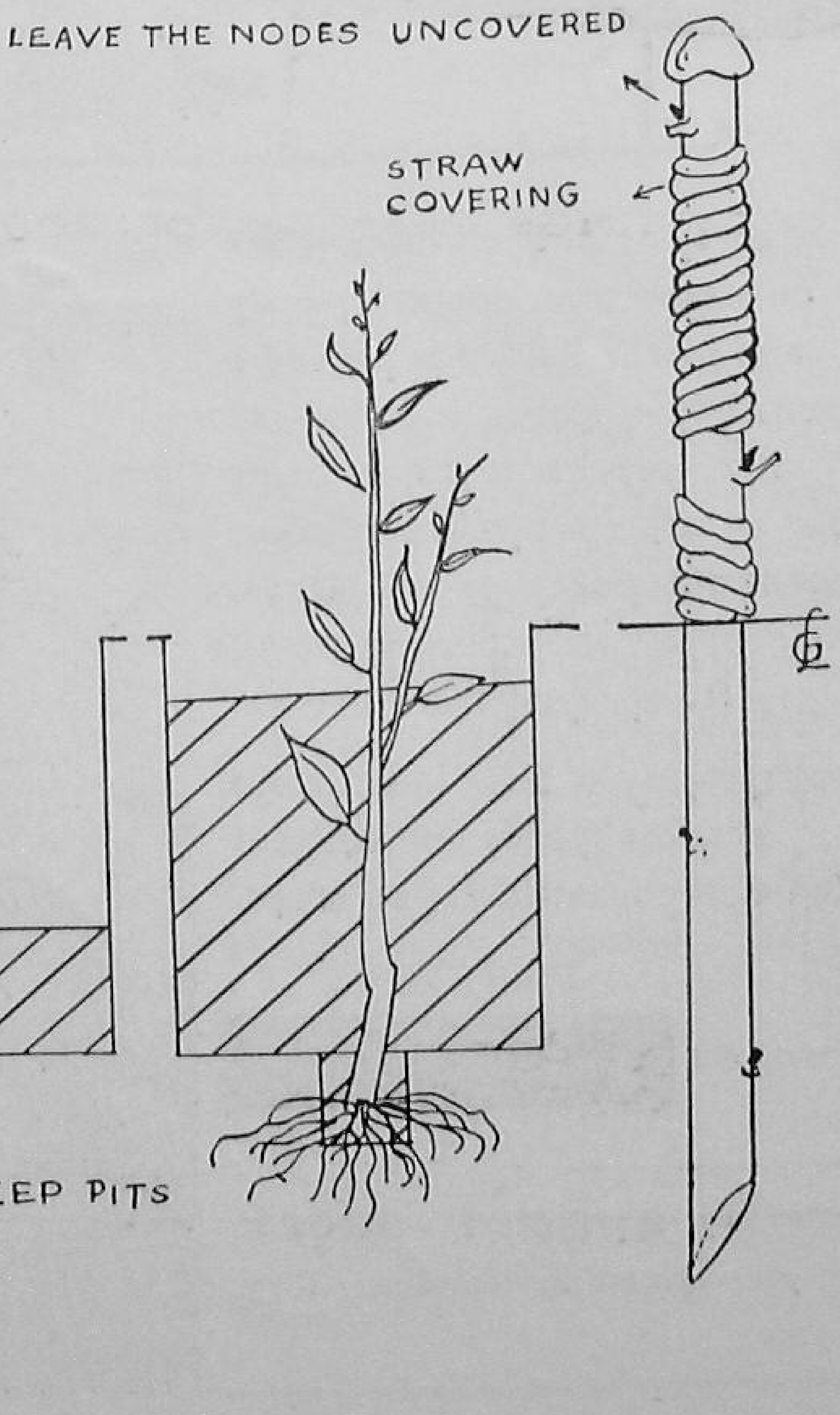
A mixture containing sand and charcoal powder, if applied in the nursery soil, will induce better root formation in the cuttings. Growth regulators like indol acetic acid and indol butyric acid can also be used for promoting root growth.

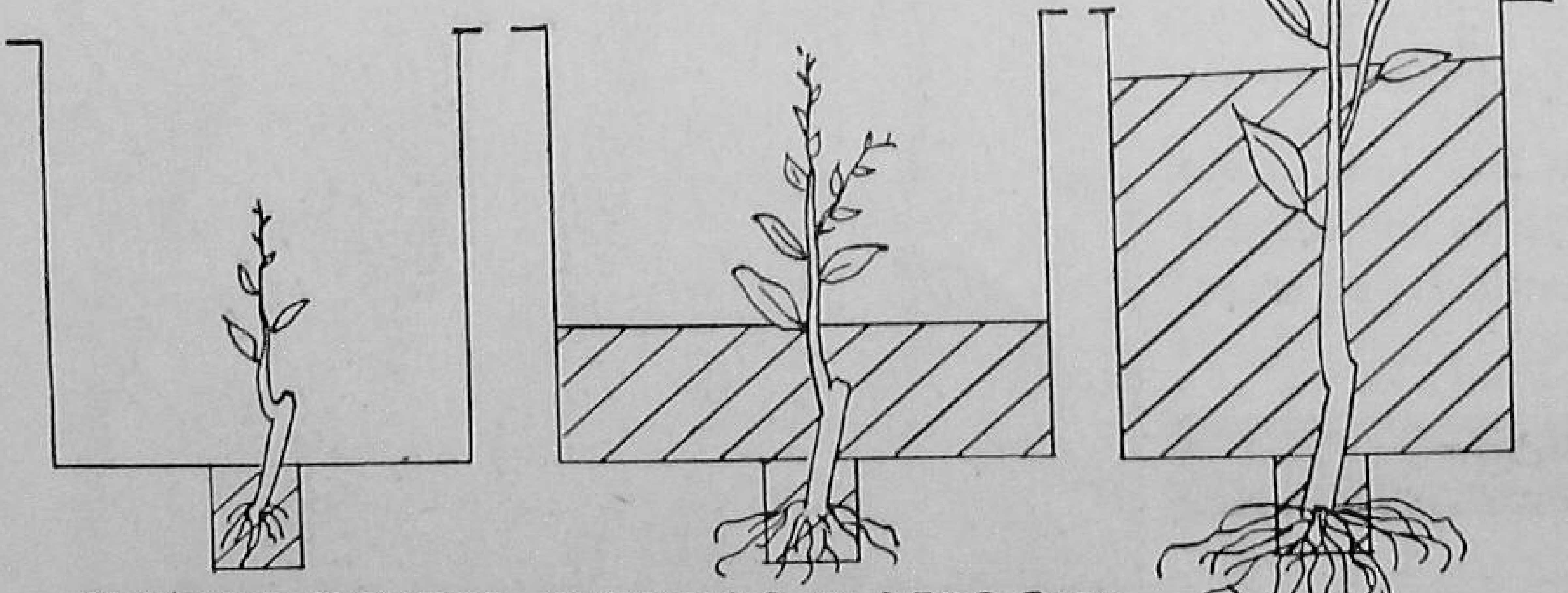
RAISED BED IS BETTER

In the nursery, make raised beds (four feet wide and nine to twelve inches high). The soil of the bed should be loose, drainable and rich in organic matter. Provide irrigation channels all around the beds, so as to irrigate the plants through the soaking effect of water let into these channels. This will prevent crust formation of the soil and help the growing plants get enough water in the root-growing regions.

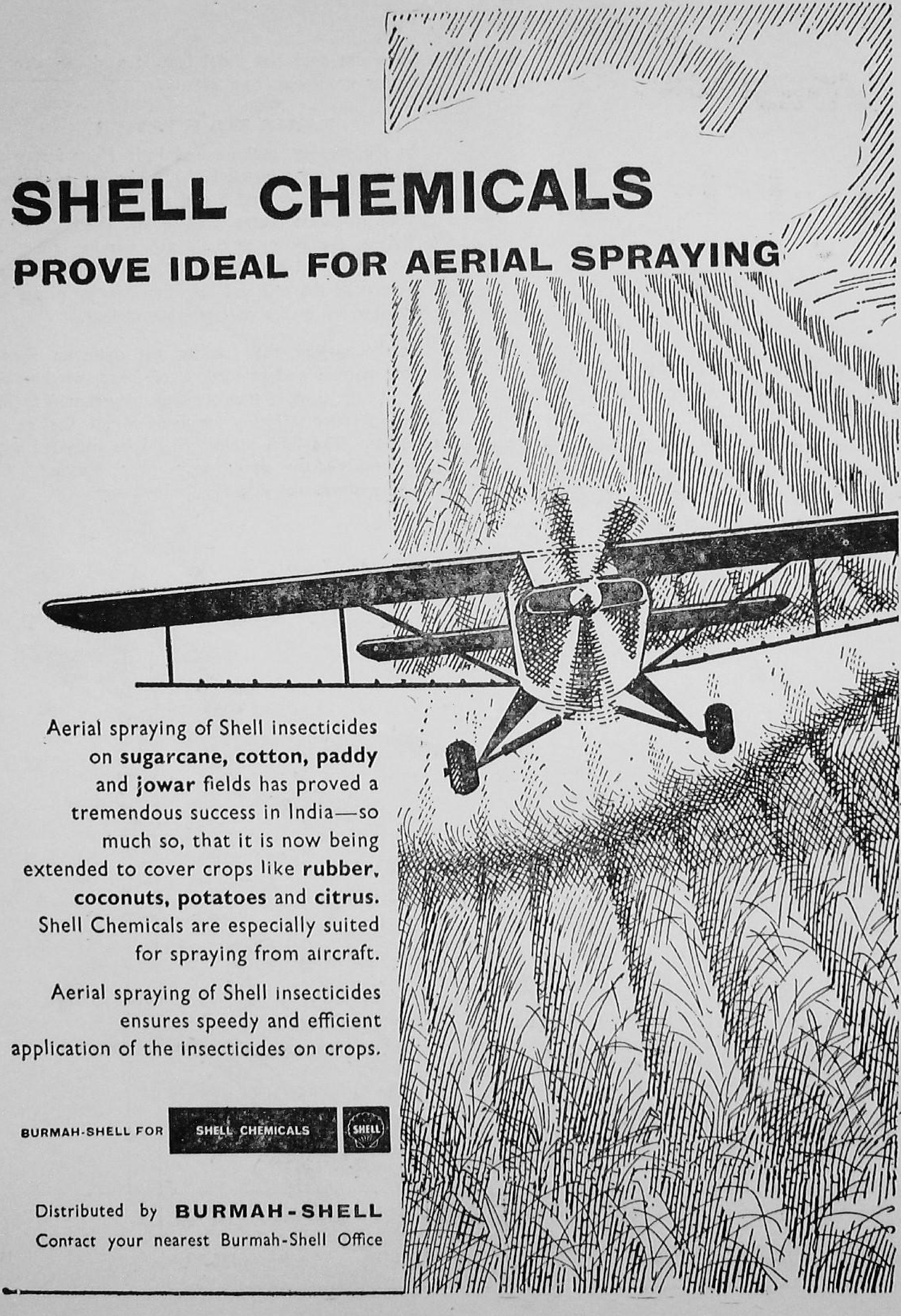
In the nursery, the cuttings get optimum shade, water, manure and protections of fence, wind-breaks etc. At the time of transplanting, they should not be made to suffer suddenly for want of all the above comforts. The limb-cutting should be provided with a wet-paddy-straw cover soon after planting. All plantings should be done in the evenings.

PROTECTION TO LIMB CUTTINGS





PLANTING ROOTED CUTTINGS IN DEEP PITS IMPROVES DROUGHT RESISTANCE


SHELL CHEMICALS
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Aerial spraying of Shell insecticides on sugarcane, cotton, paddy and jowar fields has proved a tremendous success in India—so much so, that it is now being extended to cover crops like rubber, coconuts, potatoes and citrus. Shell Chemicals are especially suited for spraying from aircraft.
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SESBANIA manures the second RICE CROP too

By
C. R. G. K. SASTRY
and
P. B. S. R. MURTY
Agriculture Training Centre, Samalkot
Andhra Pradesh

PLANTING sesbania seedlings on the paddy field bunds during the main crop season has almost become a common practice for seed production in many paddy areas. How about planting this green manure plants on bunds during the second crop season, so that green matter from it may be used for the next main crop?

Last year, at the Gram Sevak Training Centre, Samalkot (Andhra Pradesh), we gave this idea a trial. After the planting of the second crop of paddy was completed in early March, sesbania seedlings were planted on the inner side of the field bunds—two feet apart; thus, 375 seedlings were planted in an acre of field bunds. Sesbania seedlings grew up with the paddy crop. They grew to a height of three to four feet by the time the paddy crop was harvested.

When paddy was harvested, the sesbania plants were left behind. By the time the main fields were ready for preparing for planting the main crop, the green manure plants were four to six feet high.

Towards the end of June, the sesbania plants were pulled out and the yield of the green leaf obtained was found to be about 1,730 pounds to an acre.

The yield of green matter thus raised no doubt was low when compared with a pure crop grown directly in an acre of the field (which may average 8,000 to 10,000 pounds), but it has shown the way of economically getting some amount of organic matter which is rich in nitrogen and thus helping in saving the time needed for raising a green manure crop separately.

Planting sesbania seedlings along with the second crop of paddy on the inner side of the field bunds thus will provide about 2,000 pounds of excellent green matter per acre, which can be put to good use for the next main paddy crop.

ASK NOT WHAT YOUR COUNTRY CAN DO FOR YOU BUT RATHER WHAT YOU CAN DO FOR YOUR COUNTRY

The FRENCH BEAN THAT CAME FROM America

... and beat even the Bangalore bean in quality and yield

By M. L. VISHWANATH

IF THERE has been a French bean that has become popular with growers in a short time, it is the *Cultivator Contender,* the bean variety from the U.S.A.

The *Cultivator Contender,* introduced into India by the Department of Horticulture, Mysore, in 1952, has found favour with growers, even over the already popular *Bangalore* bean, because of its high yield of quality pods.

When tried by the Horticultural Department, Mysore, it proved superior to *Bangalore, Red Kidney, Asgrew Stringless, French Yellow, Canadian Red, Bountiful, Burpees Stringless, Canadian Wonder, Stringless Green Pod, College Early, College Pride* and *College Supreme* in either yield or quality of pods, or both. Its pods are fleshy and stringless with an excellent flavour.

This bean grows best under moderate weather conditions. In places where the summer is not very severe, you can start sowing from February and continue till the end of October-November. Avoid sowing during the monsoon period as the beans are likely to get diseases during this period. November to February is the ideal period for planting *Contender* beans.

For growing this crop, a light sandy loam is suitable. Medium clay or heavy clay soils cause wilt disease and the beans suffer very badly on such soils.

Plough the land about 25 cms. deep, break the clods, remove the weeds and then leave it for aeration for about two weeks.

Next, add about 6 metric tons of well-rotted farmyard manure and 180 kilograms of 4:12:4 N.P.K. fertilizer and mix thoroughly with the soil. After applying the fertilizer, divide the fields into convenient-sized plots with irrigation channels at 15 cms. distance. Make 5 cms. deep furrows 60 cms. apart.

Sow the seeds in the furrows keeping a distance of 15 cms. Irrigate lightly. Give a light irrigation once a day for 23 days or till earthing is done. Afterwards, irrigate once in three or four days.

Seeds will germinate within a week's time. Two weeks later, spray one per cent Bordeaux mixture or any other copper fungicide. It is a good practice as it helps prevent the fungus diseases, particularly the anthracnose disease, from attacking the crop. This disease appears as dark brown sunken spots on the

pods and the fleshy parts of the shoots. Once the disease appears, it becomes difficult to control it.

When the plants are 15 days old, loosen the soil of the ridges and heap up in the furrows. This way the former furrows now become the ridges and the ridges become furrows.

No cultural operation should be carried out when the foliage is wet as this helps in spreading the diseases.

Plants start flowering when they are a month old. Spray one per cent Bordeaux mixture or any other copper fungicide once again after the flowering ceases.

Other diseases which may attack the crop are rust and mosaic virus.

Rust appears as brownish yellow pustules on the leaves. Remove the infected parts as and when you notice, and burn them. Also dust affected plants with sulphur to control the disease.

The mosaic virus causes the leaves to assume a mottled look and the plants become stunted and do not produce any fruit. As this disease is seed-borne, take care to avoid infected plants for leaving pods for seeds. Collect pods for seeds only from healthy plants.

During the growing stage of the crop, pests like red spider mite and jassids may attack the plants.

The red spider mite sucks the sap of the leaves. The leaves get a mottled appearance. In case of a heavy attack, leaves start rolling backward. Control the pest by spraying 0.02 per cent 'Malathion' or dust sulphur on the central surface of the leaves.

Jassids are green hoppers which also suck the sap of the leaves. As a result, the leaves turn yellow and roll. Spray 0.02 per cent 'Parathion' to control it. *Caution: Do not use 'Parathion', if the pods are to be used for consumption within 15 days of treatment.*

With this much of attention, a crop of *Contender* will bring you very high profits. The fruits become ready for harvest after 45 days of sowing. Harvest as and when they are ready.

FORESTRY COOPERATIVES PUNJAB TAKES THE LEAD

A novel experiment in farm forestry is in progress in the Kangra District of the Punjab. Farmers in this region have banded together into Cooperative Forest Societies for the protection, improvement and regeneration of the forests in their area. The scheme is in operation in about 70 villages, covering 60,000 acres.

The members of these societies with the assistance of the Forest Department have prepared suitable working plans for their forests. These plans include rotational closure for grazing and fodder cutting, planting of fodder trees, and anti-erosion measures. The sowing and planting of trees is done by the members themselves, but the engineering works for check dams, trenches, and training of torrents are paid for by the Government. A subsidy of Rs. 50,000 is granted for this purpose.

In addition to planting trees in their fields and home-steads, Punjab farmers are getting the full benefit of a tree cover by raising such farm forests.

LOBIA SHOULD FIND A PLACE IN EVERY FARM

By
A. N. KHANNA
Government Vegetable Research Station
Kalianpur (Kanpur)

THE *kharif* season is the sowing time for *lobia*. Many farmers plant *lobia* for fodder, either pure or mixed with *jowar, bajra* and maize, and also as a green manure crop. In the South, they grow it as a pulse crop. But very few grow it as a vegetable.

Yet, as a vegetable, lobia is highly nutritious, from which a large number of dishes can be prepared and economically too. Its pods, green or dried, are almost as good as peas. In fact, *lobia* is a rich and at the same time an inexpensive source of vegetable protein. Hence, it deserves to get a place in every vegetable farm and kitchen garden along with other *kharif* vegetables.

Lobia, being a warm weather crop, can stand a considerable degree of drought and, therefore, fits every farm. But under very dry conditions it will produce a poor crop. Though it cannot withstand low temperatures, it can put up with moderate shade. Hence grow it as an intercrop in an orchard, if you have one.

SOIL AND MANURE

No other legume can grow so successfully on such a wide variety of soils as can *lobia.* A very rich soil is not good, as on such soils an abundant vine growth is produced while the yield of pods and grain is less. The poor soils will produce a little growth of vine but will generally yield a good proportion of pod.

You don't have to apply any extra dose of nitrogenous manure or fertilizer. It won't need any more nitrogen than what is already there in the soil. For increased pod and seed yields, however, add superphosphate at the rate of two maunds per acre to the soil, while preparing the field for planting *lobia.*

WHICH VARIETY TO PLANT

There are many varieties which are grown for fodder and green-manuring. For vegetable purposes, there are a few varieties which are heavy yielders of tender and soft pods. The following are the most popular varieties.

Pusa Phalguni

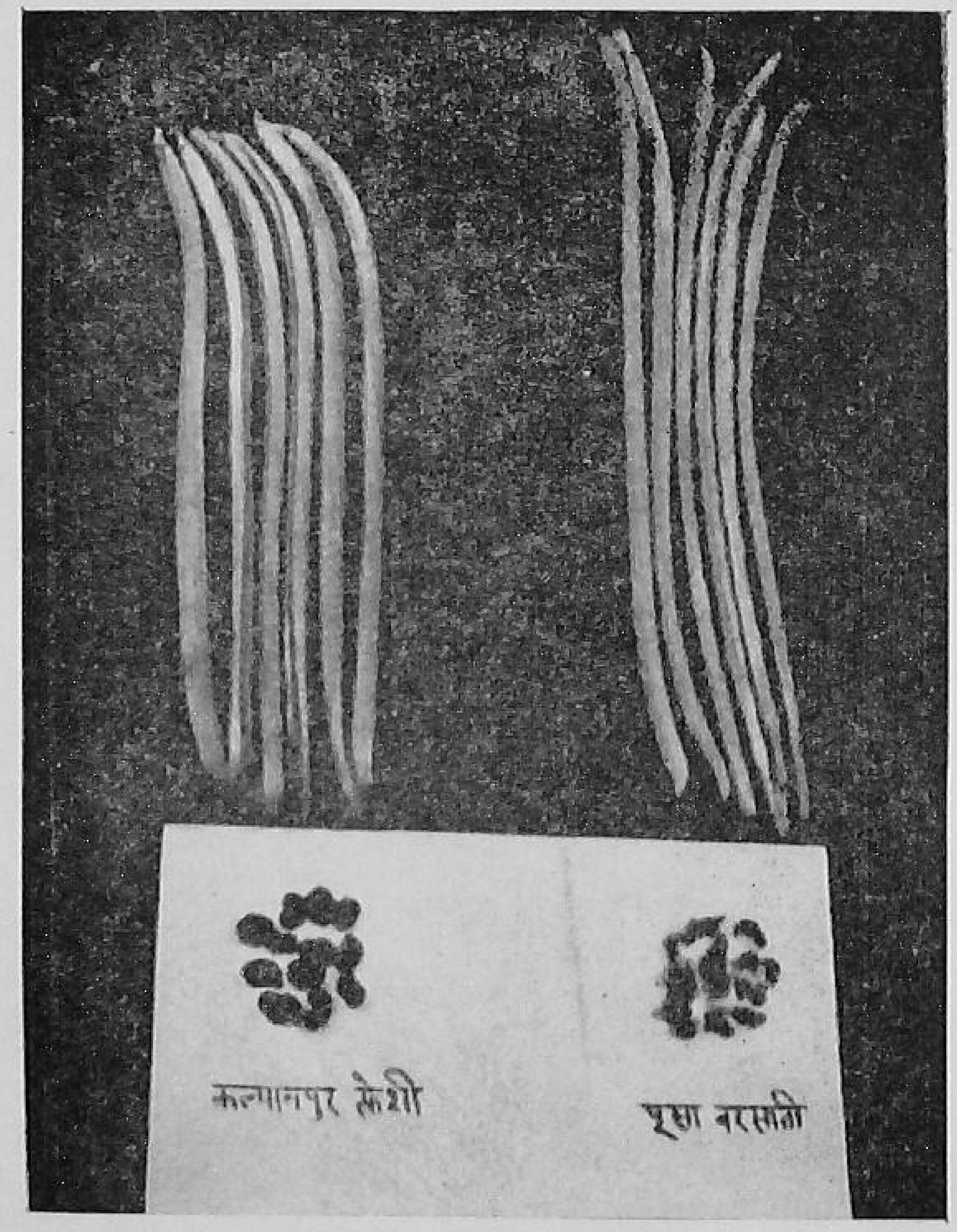
Dwarf plants with bushy habit; pods 5-inch long; ready in 60 days, suitable for February-March sowing.

Pusa Barsati

Creeping plants, pods 10-11 inches long; ready in 45 days, suitable for June-July as well as summer sowing.

Kalianpur Fleshy

Creeping plants, pods thick and fleshy about 8 to 9 inches long, ready in 70 days, good as a late variety for June-July sowing.



Kalianpur Fleshy *(left) and* Pusa Barsati *are two popular* lobia *varieties*

WHEN AND HOW TO PLANT

You can plant *lobia* at any time between February and August. In places where warm weather starts earlier, you can plant it even earlier. For vegetable purposes, plant *lobia* in lines. The distance will vary with the variety and season.

	ZAID		KHARIF	
	Line to Line	Plant to Plant	Line to Line	Plant to Plant
Pusa Phalguni	1½′	6″	2′	6″
Pusa Barsati	1½′	9″	3′	9″
Kalianpur Fleshy	Broadcast		6′	1″

Dibble two seeds per hole to get a proper stand of the crop. To get a continuous supply of fresh pods, either plant in instalments or raise varieties with different maturity dates.

INTERCULTURE AND AFTERCARE

Hoe the crop, especially the bushy types, from time to time to keep up the moisture content of the soil and to remove the weeds. Give the first irrigation in summer a month after sowing and then a couple of weeks after. If it is a creeper type and you are growing it in a kitchen garden, allow it to creep on some support. This will ensure clean fruits and easy picking. If in fields, allow the creeper to climb on *jowar* and maize if it is grown mixed with these crops.

There is no serious disease which attacks *lobia*. Sometimes it gets an attack of plant lice or bean aphis. Both the young ones and adult insects of both these pests suck the plant sap and weaken the plant. Spray nicotine sulphate at the rate of 300 to 400 litres per acre. In a kitchen garden, 2 to 3 litres per bed of 10 to 15 feet will do.

You can yourself prepare nicotine sulphate by mixing 4 per cent nicotine sulphate, one part of crude soap, 1 to 1.5 Kg. per 200 litre spray-mixture in 400 to 500 parts of water.

Thus with a little care you can grow a crop which gives a vegetable of high nutritive value.

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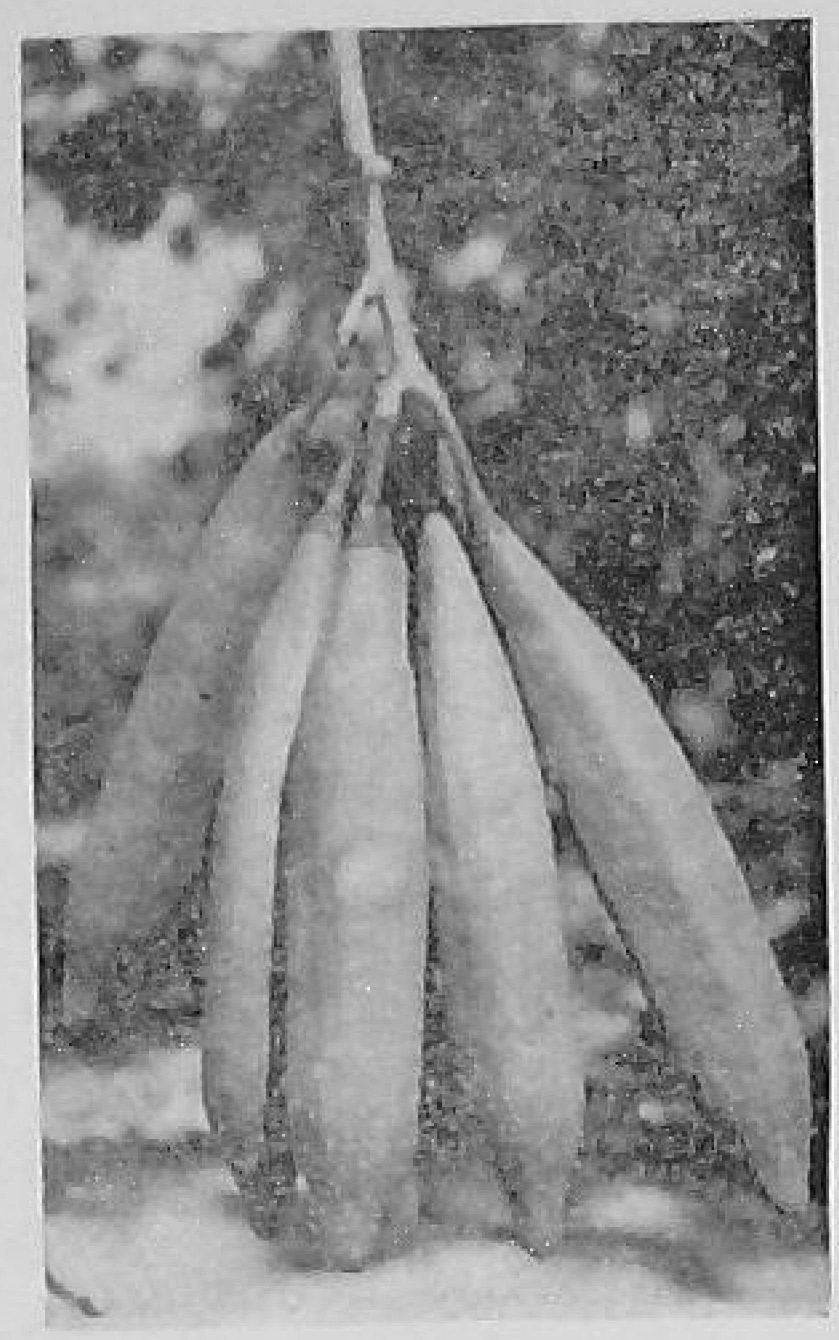
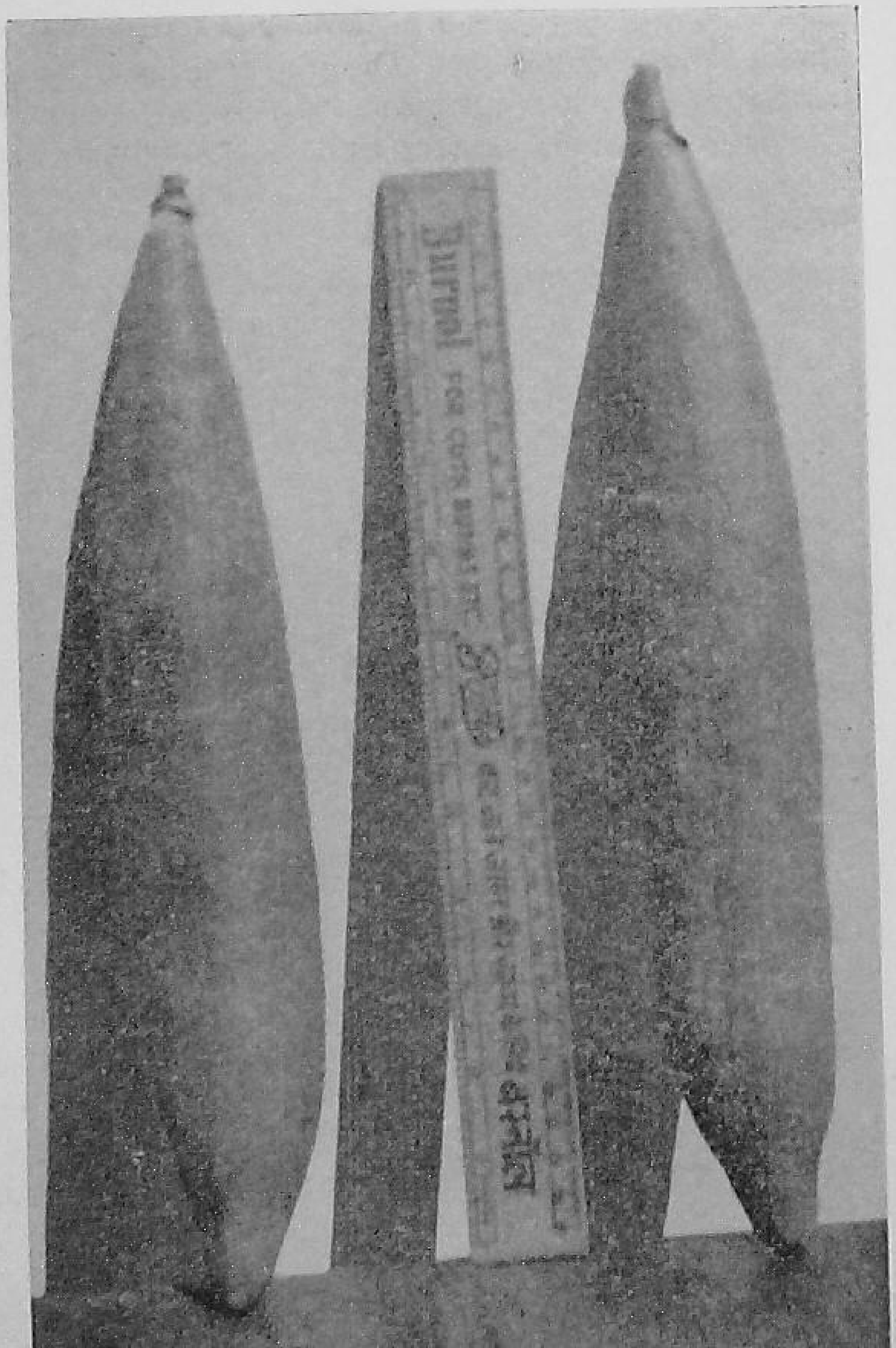
here is something new in **SILK COTTON**



By
P. N. ANANTHARKRISHNA RAO
Superintendent, Paddy Breeding Station, Mangalore

It is not only a new silk cotton tree, but also gives pods that don't burst



CEIBA is the new silk cotton with several virtues.

This tree (full name *Ceiba pentendra*) is found ideal for avenues and garden boundaries in towns. Another useful trait it has is that the pods just split, but do not burst when mature. Thus, no floss is wafted away by wind. The pods are longer than the local too, and is borne in clusters in plenty all over the branches.

Ceiba is also hardy. Once planted, the tree needs almost no attention. The tree yields well no doubt when it gets sufficient moisture; but also gives satisfactory yields even on the driest patches on the hill-tops.

You can raise the plant from seed. On the West Coast, where the South-west Monsoon commences in June and brings in a heavy rainfall of nearly 3,500 m.ms. by the end of September, the following schedule of cultivation is just suitable. For other places you have to suitably alter the time of sowing and transplanting to make the most of the monsoon rains.

Pods are mostly more than a foot long

Raise the trees this way : In April-May, when seeds are available, sow them in a nursery, taking advantage of the pre-monsoon showers. The seedlings can be planted out when the monsoon has subsided, and the soil is in the right condition for planting. You can also sow the seeds in the nursery in August, and maintain the seedlings there without watering till next May, when they can be planted out as soon as the pre-monsoon showers are received. This method you can follow if you cannot pay much attention to the raising of plants. This way the seedlings also become hardy at the time of planting, and have the benefit of the full monsoon for establishing themselves without the help of irrigation.

RAISING SEEDLINGS

The seeds are hard, and need soaking in hot water at 90°C for ten minutes before sowing to make them germinate. Pots or useless deal-wood boxes are good for raising seedlings in, as you can control watering and drainage in them easily.

You can also sow the seeds in the ground. For this, dig shallow trenches of about 15 cm. depth, 60 cm. width and of convenient length on the ground. Put the dug-out soil along the edges of the trench. Fill this trench up to a depth of about 15 cm., with a mixture of rubble, twigs, dry leaves, fibre or rubbish available. Spread gravelley soil on this to cover the interspaces and form an even and firm, but springy surface. This kind of bed provides good aeration and drainage and prevents the upper soil from becoming hard.

The deeper the bottom, the better it is for the germination and quick development of the seedlings. Spread the coarser fractions of potting mixture up to a thickness of about 5 cms. over the layer of gravelley soil. Apply the finer fractions of the potting mixture up to a thickness of another 5 cms. over this layer. Level the top of this layer.

You can prepare the potting mixture by mixing equal proportions of well-rotted and non-sticky cattle manure, fine sand and good field soil. The lower layers of a well-preserved manure heap yield the right type of dark, non-sticky yet moist cattle manure which crumbles easily while handling. After the three ingredients are thoroughly mixed, sieve the mixture to separate the finer particles from the coarser ones.

Sow seeds in lines about five cm. apart and one cm. deep in small furrows made with a stick. Fill the furrow with the potting mixture. Drench the nursery bed thoroughly but gently with a rose-can. You can use a sprayer instead, if available. Give further watering once a day or oftener to keep the bed moist but not very wet. Keep off ants by throwing a cordon of DDT or BHC powder around the nursery beds. The seeds germinate in the course of a week to ten days. Keep the nursery beds moist by watering if showers are not received.

Where seeds are to be sown in August and maintained in the nursery till the next monsoon, prepare the nursery bed by stirring up the soil to a fine tilth and mixing it with a light sprinkling of well-rotted manure. Once the seedlings are established and are about a month old, they can survive without any further irrigation till the next monsoon.

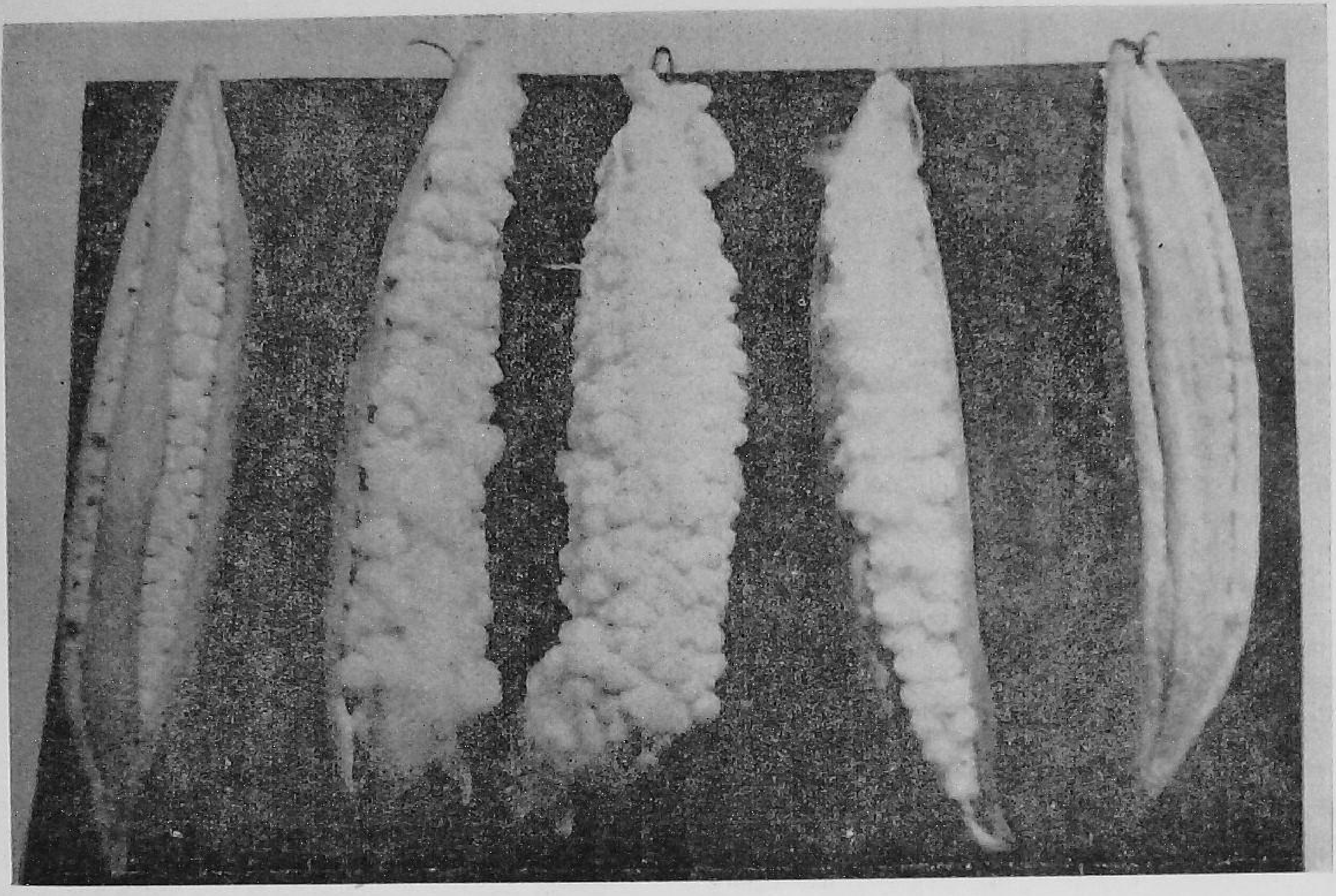
TRANSPLANTING

A good start enables a plant to anchor itself firmly in the soil and develop a sturdy tap root which is very necessary for its subsequent development and survival under adverse conditions. Dig pits of at least 30 cm. by 30 cm. in the places where the seedlings are to be planted. Burn dried vegetable matter in the pits. Some days after the burning, fill the bottom of the pit with twigs and branches up to a depth of about 10 cm. to provide good drainage. The rest of the pit may be filled with a mixture of soil and well-rotted farmyard manure in the ratio of 3:1. Alternatively, the pit may be filled completely with green leaf and good surface soil spread over until the pit is filled. In the latter case, transplant the seedlings at least two months after filling the pit, so that the soil and leaf may settle down properly during the interval.

Transplant seedlings with a spacing of not less than six metres between plants.

Transplanting is best done on a cool evening. Water the nursery bed and the prepared pit in which the seedlings are to be transplanted a few hours before transplanting, so that they are both moist but not sticky at the time of transplanting.

Lift the seedling carefully from the nursery bed with a ball of earth sticking to it and plant along with the ball of earth in a corresponding depression scooped out in the prepared pit. Press gently the soil around the plant, so that the roots may establish a firm contact with the soil.



One good thing about this new silk cotton is that pods when mature just split and do not burst; thus the floss is not easily blown away

Water the plants liberally but avoid stagnation of water around the plants at all times.

Seedlings transplanted at the beginning of the monsoon do not require any watering while those transplanted later in the season may be watered once a week, though they have been found to survive even without watering. Lightly manuring the plant at the beginning of the monsoon and digging around and providing mulch to the plants at the end of the rainy season greatly enhance the yield, but the trees survive and give fair yields even with no attention. Pests and diseases seldom occur on the plants but bats cause some loss by nibbling away the pods.

The tress begin to yield from the fourth year onwards, but the yields are at their best only after the seventh year. They bear regularly. Flowering is observed in November-December and the pods are ready for harvest in March. The trees shed their leaves just before flowering. Whenever heavy bearing is noticed, better prop up at least the lower branches with supports to prevent them from snapping as a result of the weight of the pods.

PICKING

Pick the pods when they show signs of drying up with a hooked pole and dry them for four to six days when the rind splits lengthwise and the floss puffs out. Peel off the rind and separate the floss from the central core. Put this floss which contains seed in a circular bin up to a height of about two feet. Churn this floss with a pole provided with a star-shaped projection at its lower end. The seeds separate out from the fluff and collect at the bottom of the bin.

A good tree bears nearly a thousand pods per year and yields about 7 kilograms of clean fluff valued at Rs. 20 to 25 and about 700 grams of seed. A gram of seed contains 15 or 16 seeds.

a new SEED-DRILL for sowing wheat

By V. P. S. KASHYAP

A GOOD wheat yield depends much on the way you sow the seed. It is important to sow seeds in the right quantity per acre, at the proper depth and at the proper distance.

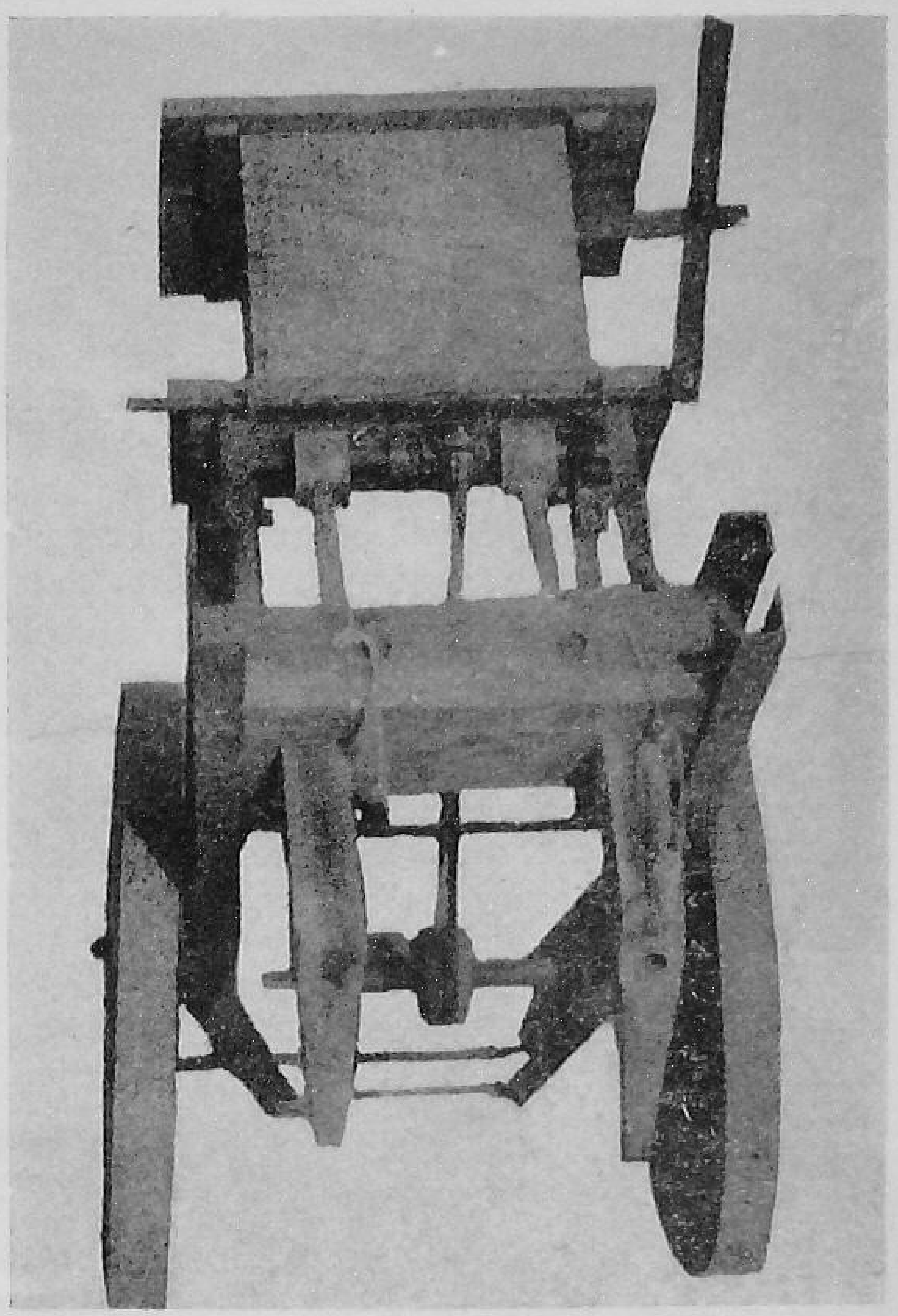
Of the three sowing methods—broadcasting, dibbling and drilling—the last one has been found to be the best method for sowing wheat. With this method, the seed can be sown in the right amount and placed at the correct distance and the proper depth.

Broadcasting is defective, because it requires more seed per acre and no interculturing can be given to the crop. Dibbling assures proper seed-rate, depth and distances. But it is too laborious and time-consuming a method to be adopted for sowing seeds on a large area. Drill-sowing does not require so much labour and time, and is generally adopted by farmers.

To get the best results with drill-sowing, however, it should be done with an implement fitted with a device to drop the seeds correctly. For when the seeds are dropped with hands, there is always a danger of sowing more seeds and placing them closely.

There are seed-drills available, with which the seeds can be drilled in a proper way and in the correct amount. But they are too costly for an average farmer.

The workshop wing attached to the Government Extension Training Centre, Antri, Madhya Pradesh, has evolved a cheap and efficient seed-drill. After



trials, this seed-drill has been found to be very good for sowing wheat. It can be repaired and manufactured by any village artisan.

The angle-iron frame of the seed-drill consists of two parts. They are hinged at one point in such a way that the downward and the upward movements of each part are free on the rod, which connects the two parts together. In-between the four angle iron pieces of the front part of the frame, a wooden block of 10 inches × 6 inches × 4 inches size is fitted in the centre. With this block one end of the beam is so fastened with a bolt that the beam and the front part of the frame move together as a single piece. There is a lever arrangement on the beam just ahead of the wooden block, to raise and lower the furrow-openers.

In rear part of the frame, another wooden block of 17 inches × 6 inches × 4 inches size is held in-between the four angle irons on the back end. A little behind on the fore-end of this part of the frame, two wooden pieces are fixed separately in between the two

angle irons of each side, to serve as bearings. The frame as a whole is fitted on to two wooden wheels of two feet diameter through an axil. To prolong the life of the wheels, iron rims are fitted into them.

On the one inch diameter axil, one wheel is fixed while the other is free to rotate, making the turning of the implement easy without skidding. In the centre of this axil, a three-inch diameter pulley, made of wood, is fixed. It revolves when the implement is dragged forward and provides power to another pulley for rotating the seeding rollers shaft beneath the seed box. Both the pullies are connected through a cotton-rope belt.

The pully beneath the seed box is free on its shaft and has four teeth on one side, which, on engaging wi.h the similar four teeth on the socket fixed on the shaft, make the two seeding rollers revolve in their places. A lever arrangement is provided to engage and disengage the pulley with the socket, as and when desired. The two seeding rollers are grooved ones, which on revolving take the grains in their grooves and drop down the same in the tin funnels separately. These funnels are fixed around the rollers.

To control the amount of the seed to be sown, one rubber roller is fitted in front of each seeding roller on the lower plate of the seed box. The seeds from the funnels go to the two different furrows opened by the furrow-openers. These furrow-openers are made of wood and are fixed one foot apart in the wooden block fitted on the back end of the frame. The points of these furrow-openers are of steel, just to make penetration easy. A hole is provided in the body of each furrow-opener, in which rests one end of each of the seeding tubes coming from the two funnels. This hole is made in that part of the furrow-opener's body which runs parallel to the ground while opening the furrow, and hence avoids any possibility of closing the openings by clods. In this way, the seeds are placed on the firm ground, at proper spacing and depth and are later on covered by the loose soil. The seed can be sown up to a maximum depth of 5 inches by this implement.

Special Features :

(1) The furrow-openers are basically the same in design as are used in the case of the *kharif* Dufan in District Mandsaur in Madhya Pradesh.

(2) The hole in the body of the furrow-opener is made in the same manner as is made in the 'nai'—a plough used locally for sowing purposes.

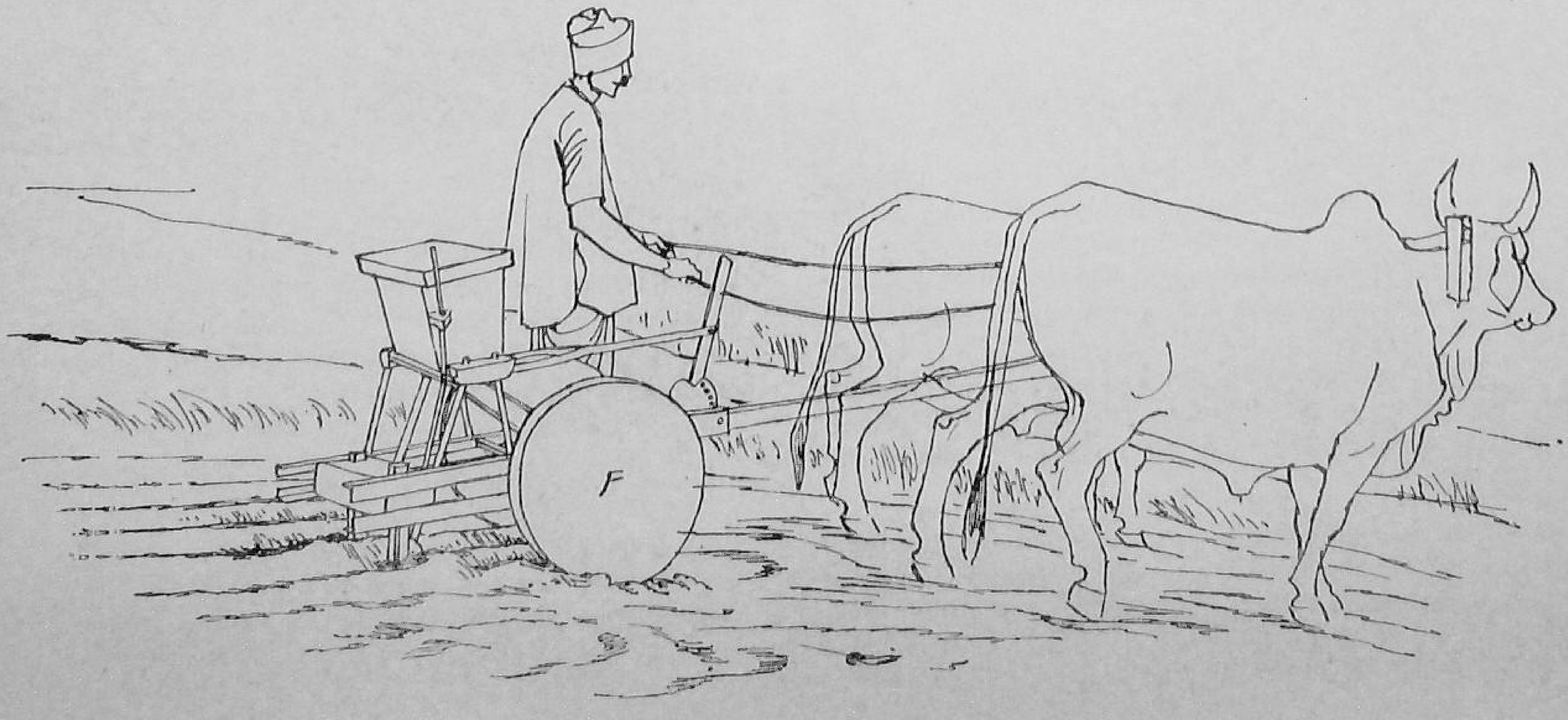
(3) The seed is sown at the rate of 20 seers per acre.

(4) The implement can also be used to some extent in mild cloddy fields.

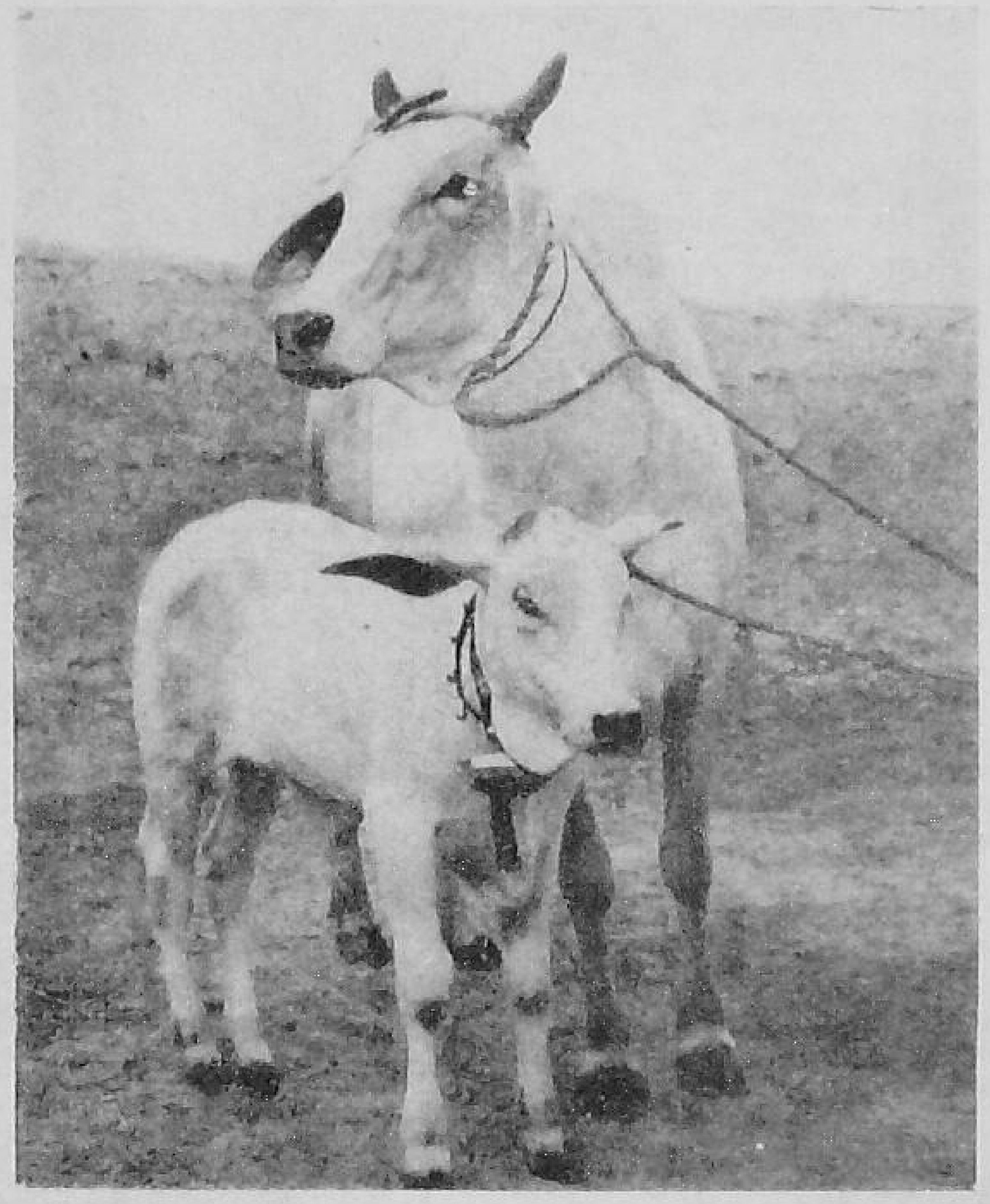
(5) The seed box serves the purpose of the seat for the driver. While sitting on it, he can easily operate the lever provided by the side of the box, as and when he desires.

(6) Furrow-openers, once raised above the ground level, make the transportation of the machine easy from one field to the other.

Such an efficient implement costs only Rs. 45. This is low when compared to the price of the other seed-drills available in the market at present.



NONE COULD BEAT HIS COW AND CALF IN THE RALLY



By
C. A. THOMAS
National Dairy Research Institute
Karnal, Punjab

IT WAS sheer confidence and enthusiasm that made Chatrabhuj walk all the way from Jhanjeri to Tikri with his cow and the calf. Chatrabhuj, would not miss the 'Tikri Calf Rally', organized by the National Dairy Research Institute, Karnal.

Thirty-five-year old Chatrabhuj was all smiles when his calf was declared the 'best' animal of the show—much to the envy of the owners of the rest of the young ruminants lined up at Tikri. As a half-bred Tharparkar, the young calf also seemed to be full of pride, since he was the foundation of a new breed named 'Karna'—a good omen for milk production in the Karnal District—where the Tharparkar is being widely introduced. To cap it all, the calf's mother also got the coveted first prize.

So when I remarked "you must be happy", prompt was his reply "Surely, I am very happy, but not at all surprised, for I was sure that there was none who could beat my cow and the calf."

Dairy farming is Chatrabhuj's ancestral occupation. Since his childhood, cattle have been his first love. Careful breeding, feeding and managing them properly are to him the fundamentals of a successful dairy farmer. "Take care of your cattle and they will take care of you", he assured me, when I enquired of him the secret of a successful dairy farming.

He is very particular about feeding. At home, he said, he is careful in personally seeing to it that his cattle get the best feeding possible.

He grows fodders for his herd. He raises a mixed crop of berseem, lucerne and oats during *rabi* and *jowar*, *guar*, maize and cowpea in *kharif*.

On being asked about the exact amount of ration he gave to each stock everyday, Chatrabhuj replied

that 25 seers of chopped green fodder and five seers of concentrate mixture consisting of wheat bran, barley, gram and oilcake were the main items of feeding stuff for the animals. He never forgets to add a *chattak* of common salt to the feed.

During the summer time, he feeds his cattle with wheat *bhusa* mixed with green fodder. He believes that expenses on feeding the animals should not be considered as an item of expenditure but an investment. "Good investment will bring in good dividends in the long run, as the offspring would be of excellent quality" he said.

On my questioning him about the rearing of calves, he remarked that he provides them with the best of feed. "This is very essential", he said, "as it would go a long way in improving and strengthening the herd when these calves grow up. Allow the new born calves to suckle one quarter of the mother's udder for the first month and later on supplement it with green fodder."

Chatrabhuj told me that he gets about 10 seers of milk per buffalo, and 12 seers of milk per cow a day. The cow's milk is consumed at home. He converts the buffalo's milk into ghee, butter and *lassi*.

Chatrabhuj thinks that the cow is ideally suited to our rural economy. Being a dual-purpose animal, she can give milk as well as work bullocks. Unlike many cattle-owners, Chatrabhuj does not dispose of his dry animals. Instead he feeds them on the same ration and takes special care during the three months before they calve. He is very particular in showing his cow to a really good and healthy bull for covering. He never allows the pregnant animals to move about continuously for long periods. He feeds them with *bajra* and *gur* for strength and provides proper shelter for them against bad weather. The calves they produce are always healthy and strong.

Chatrabhuj hopes to raise more cows of Karna breed in future.

THE *HANSA* MILK TEST

By
HARBANS SINGH
Animal Husbandry Specialist, Directorate of Extension
New Delhi

DISHONEST milk vendors commonly adulterate milk to earn extra profit. One common way they adulterate cow milk is to mix it with diluted buffalo milk. That is how they increase the volume of the milk and make a larger profit. Many milk supply schemes in the country are now faced with this problem.

Hitherto, there was no satisfactory method of detecting this type of adulteration. But now, a reliable, sensitive and rapid test has been developed at the National Dairy Research Institute, Karnal. The test is named 'Hansa' Milk Test.

The principle on which the Hansa Test is based is the same as used in diagnosing a disease. Skimmed buffalo milk is injected into rabbits, and the antibodies produced are collected and purified to make the specific anti-serum. When this anti-serum is added to buffalo milk, the tiny particles of casein of buffalo milk group together into large-sized particles which can be easily seen.

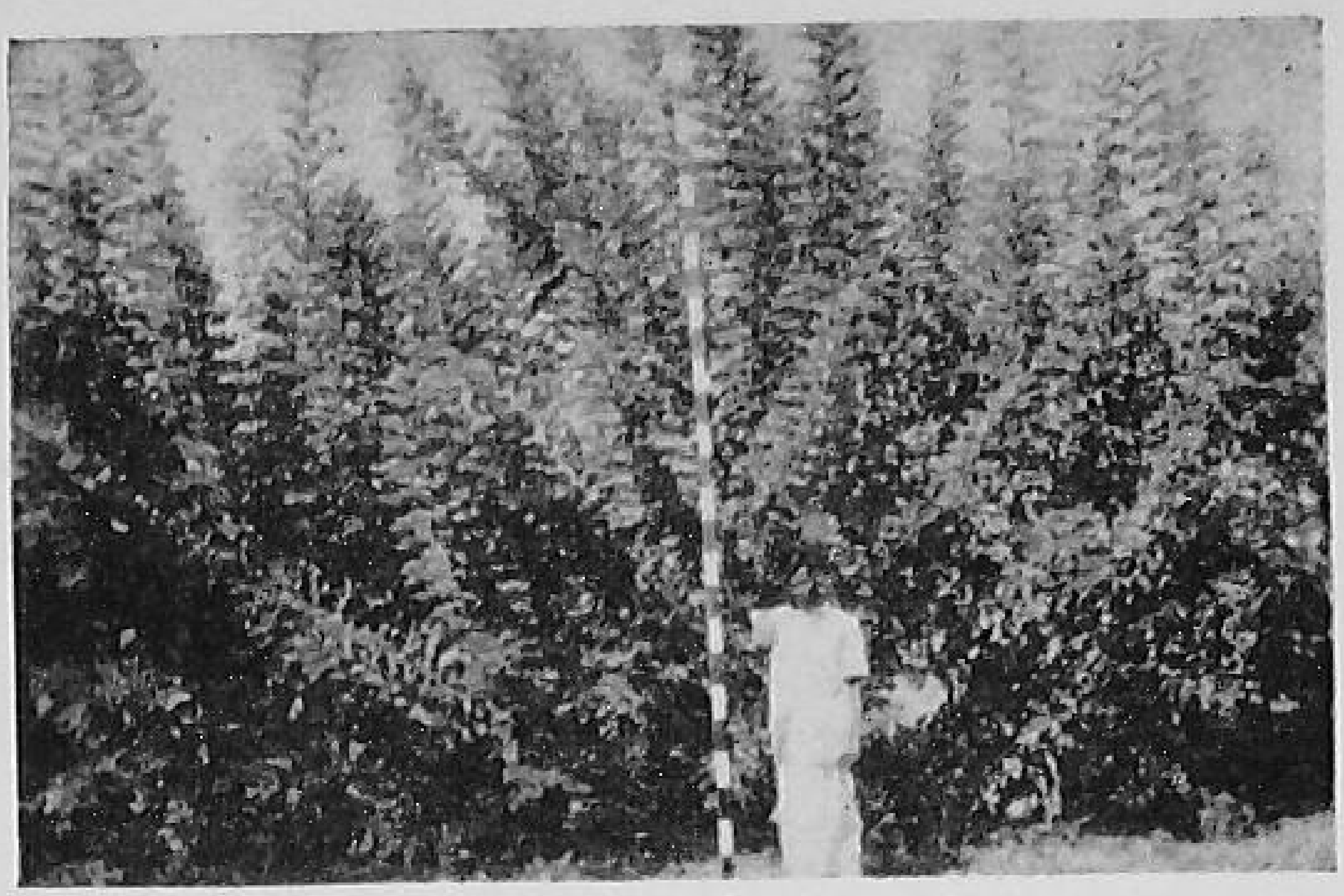
The method of using the test is very simple. Anyone can do it after being properly trained.

Place a drop of the milk to be tested on a clean glass slide. Place one drop of serum (testing fluid) over this drop of milk. Mix both the drops with a clean glass rod or a thin piece of wood (tooth pick). Then lift the slide carefully, and gently rock it in the hand. If the milk sample contains buffalo milk, the mixture on the slide will show within a minute clear flocculation of milk casein particles. With pure cow milk, there is no change in the appearance of the mixture.

The test is extremely sensitive. Even a small adulteration of one part of buffalo milk in 100 parts of cow milk can be found out. The test is also not very expensive, the cost being about 5 nP per test.

A kit containing equipment for performing 50 tests has been designed. It weighs only about 1.5 kilograms. It is very compact and handy for use in the field. You can obtain such a kit from the Director, National Dairy Research Institute, Karnal, Punjab.

GREEN-MANURE COCONUT PALMS WITH GLYRICIDIA



By
ABRAHAM THOMAS

THE question often bothering coconut growers is how to provide enough manure to their coconut plantation. Glyricidia provides an ideal solution to this vexing problem.

The coconut palm starts bearing six or seven years after planting, and continues to bear crop all the year round up to the age of 80 to 100. It thus makes a continuous demand for nutrients. The annual requirement of the coconut palm tree has been estimated at 0.75 pounds nitrogen, 0.5 pounds phosphoris acid and 1.5 pounds potash.

Glyricidia maculata, called *sheemakonna* in Malyalam, is a quick-growing leguminous plant. It contains nitrogen, phosphoric acid and potash in fairly high quantities. Its leaves when ploughed into the soil make the soil rich in plant nutrients.

Glyricidia is idealy suited for growing on the bunds of coconut plantations as well as on the bunds of paddy fields. It is found growing well from as far North as Saurashtra to Cape Comorin in the South. It is perfectly at home in almost all the soil types on which coconut is raised. Once established, it can stand periodical pruning, and give green leaf in abundance within a short time.

Glyricidia can be planted in Kerala some time during January-February before heavy monsoon starts.

You can propagate Glyricidia by seed as well as from cuttings. Sow the seeds in a well-prepared nursery, and transplant the seedlings in the field when they are about a month old. If you plant cuttings, better get them rooted before planting in the field. The cuttings generally grow much faster than the seedlings.

You can plant Glyricidia along the borders of coconut gardens, giving a spacing of five to six feet between plants. The plant grows to a height of 15 to 20 feet in about three years.

Within a year or two after planting in the field, you can lop the plants. A plant will give 15 to 20 pounds of green leaf. As the plants grow up, they will give a considerably high quantity of green leaf. Two loppings can be easily taken during the monsoon months, and the green matter obtained will be enough to meet the requirements of the coconut palm.

The advantage of Glyricidia is that it can be grown on the hedges and boundaries of coconut gardens and the leaves ploughed into the soil at different periods of the year. Being perennial, the cost of cultivation is much less than that of other green manure plants. It is less susceptible to attacks by pests and diseases.

Glyricidia leaves are rich in nitrogen-content. The leaves decay rapidly and increase the accumulation of nitrates.

Glyricidia grown round the garden will provide a good live fence. It can also serve as an avenue if grown on the roadsides.

STILL LEAVING THE WHEAT LAND FALLOW IN KHARIF?

IT'S NO LONGER A PAYING PRACTICE, RATHER A WASTEFUL ONE SINCE YOU CAN RAISE TWO OR THREE CROPS ON THE SAME LAND

By
P. C. LAMBA
Joint Director of Agriculture, Madhya Pradesh, Bhopal
and
D. S. MALIK
Professor, Agronomy, Agriculture College, Rewa

LEAVING the wheat land fallow during *kharif* before sowing wheat in *rabi* is not only unnecessary but a wasteful practice also. With proper fertilization, very successful crops of paddy, maize, early cotton, *jowar* for fodder, groundnut, *mung* or *urd* can be raised during *kharif* and an equally good crop of wheat during *rabi*.

For the last few years, a team of Japanese farmers has been demonstrating the possibility of taking two crops of paddy followed by a crop of wheat on the same land with the use of fertilizers in Saharanpur District of Uttar Pradesh. They have been able to produce more than 100 maunds of grain per acre of paddy and wheat when taken one after the other.

Similarly, in some parts of the Punjab it has been found possible to take an early crop of cotton before sowing wheat. At B.R. College, Agra, wheat has been found to do quite well after a fodder crop of *jowar* in *kharif*.

However, the double cropping needs proper supply of readily available plant nutrients.

By a judicious supply of fertilizers, good crops of irrigated wheat have been raised after paddy at the Agriculture College Farm, Rewa in Madhya Pradesh. The average per acre yields of wheat and paddy under this system had been 30 and 25 maunds, respectively. Both the crops were given 250 pounds of ammonium sulphate and 320 pounds of superphosphate per acre.

Another good thing about this system was the reduced number of ploughings given to the soil before the sowing of wheat. The soil was ploughed only three times after the harvesting of paddy and before the sowing of wheat, at the Farm.

Usually, wheat fields are ploughed as many as 10 to 12 times before, during and after the rains. In the past, it was thought that more the land is ploughed, more will be the yield of wheat. Ploughings help control the weeds, make the soil porous and more absorptive of water. Also by repeated ploughings, every bit of nitrogen in the soil is converted into an available form.

However, if the soil is supplied with the readily available nitrogen through fertilizers as was done at the Agriculture College, Rewa, the number of cultivations for preparation of seed-bed for wheat can be considerably reduced. An excessive cultivation of the soil not only increases the cost of production of the crop, but is also harmful to the soil in the long run. It results into a rapid loss of organic matter (through oxidation). Furthermore it destroys the vegetative cover that helps in checking the soil erosion during the rains.

By cropping the fallow land during the *kharif* season, the best use of the rains can be made. The crop during rains will not only give higher yields but will also provide a vegetative cover for checking the soil erosion. After its harvest it will also add some organic matter in the form of roots and stubbles. In this way, the double cropping system would help at least to maintain, if not to improve, the organic matter content of the soil.

The only thing you have to remember under this cropping system is to get the soil tested from time to time for its supply of the various nutrients so that they may not become the limiting factors in successful crop production.

For the non-leguminous crops in *kharif*, such as paddy, maize, cotton and *jowar* for fodder, application of about 200 to 250 pounds of ammonium sulphate and a basal dose of about 5 to 10 cartloads of farmyard manure or compost per acre would give very encouraging results.

For obtaining good yields, about 300 pounds of superphosphate per acre would also be needed in most of the soils. In case of legumes, supply of phosphorus would not only increase their yields but would also increase their capacity for fixation of more nitrogen for the benefit of the succeeding crop.

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WEST GODAVARI FARMERS HAIL PACKAGE PROGRAMME

OUR VILLAGE was included in the Package Programme during the *rabi* season of 1963. The farmers of the village have whole heartedly welcomed the Programme.

They are coming forward to adopt the improved agricultural practices recommended by the Package officials. This year, paddy seed for 1,000 acres was treated with 'Agrosan GN' before sowing in the nurseries. 'Endrin' was sprayed in the nurseries. Some cultivators dipped paddy seedlings in 'Endrin' solution before transplanting. Chemical fertilizers supplied under the Package Programme were used as per recommendation of the Package personnel.

The farmers are convinced that the adoption of the package of practices is advantageous to them. The paddy crop this *rabi* is far better than that of the last year. It is expected to give six to ten bags of additional yield per acre over the yield of the last *rabi*.

The foot rot disease of paddy has completely disappeared in our village, due to seed-treatment with 'Agrosan GN'. The paddy crop is better in fields where the N.P.K. mixture was applied.

Two demonstration plots have been arranged in our village. Cultivators from the area have visited the plots in large numbers.

PEMMARAJU BAPIRAJU,

President,

Large-sized Cooperative Society,

Meenavalluru, West Godavari,

Andhra Pradesh.

THE PACKAGE Scheme came into force in my village from *kharif* 1961. The Village Level Worker of our village and the Extension Officer (Agriculture) helped me in preparing a production plan and gave me advice on improved agricultural practices like using good seed, seed-treatment with 'Agrosan GN', using 'Endrin' spray against stem-borer, etc. They helped me in getting soil samples tested, and recommended the quantities of nitrogen, phosphorus and potash to be used on my land. They advised me to adopt the Japanese method of paddy cultivation.

I got the *S.L.O. 13* seed from Attili, and treated it with 'Agrosan' at one ounce in 30 pounds of seed. 'Endrin' spray was used twice in the nursery. I applied 10 cartloads of cattle manure, 50 pounds of superphosphate and 50 pounds of ammonium sulphate per acre. For transplanting I used a spacing of 8 inches × 4 inches. I gave intercultivation with a push-hoe 25 days after transplanting, and twice thereafter at 25 days' interval.

At the time of tillering, I applied calcium ammonium nitrate at 25 pounds per acre. I adopted all these practices only on the recommendation of the staff of the Package Scheme.

This year at the time of flowering, there were heavy rains, and as such the yields were reduced to 12 bags per acre in the village. But my yield was 18 bags per acre, as compared to 14 bags before taking to the Package practices. It was all due to the improved agricultural practices I followed.

Timely supply of seed, chemical fertilizers and insecticides was done by the Manchili Cooperative Society and the Attili Depot. I got these at reasonable prices.

I am a member of the Cooperative Society, Natta Rameswaram, and I got a loan of Rs. 500 which enabled me to obtain all the things at the right time.

I thank the Government for implementing the Package Scheme.

POTHAMSETTI ACHIREDDY,

Natta Rameswaram, Attili Block,

West Godavari,

Andhra Pradesh.

L5D of A/63—GIPF.

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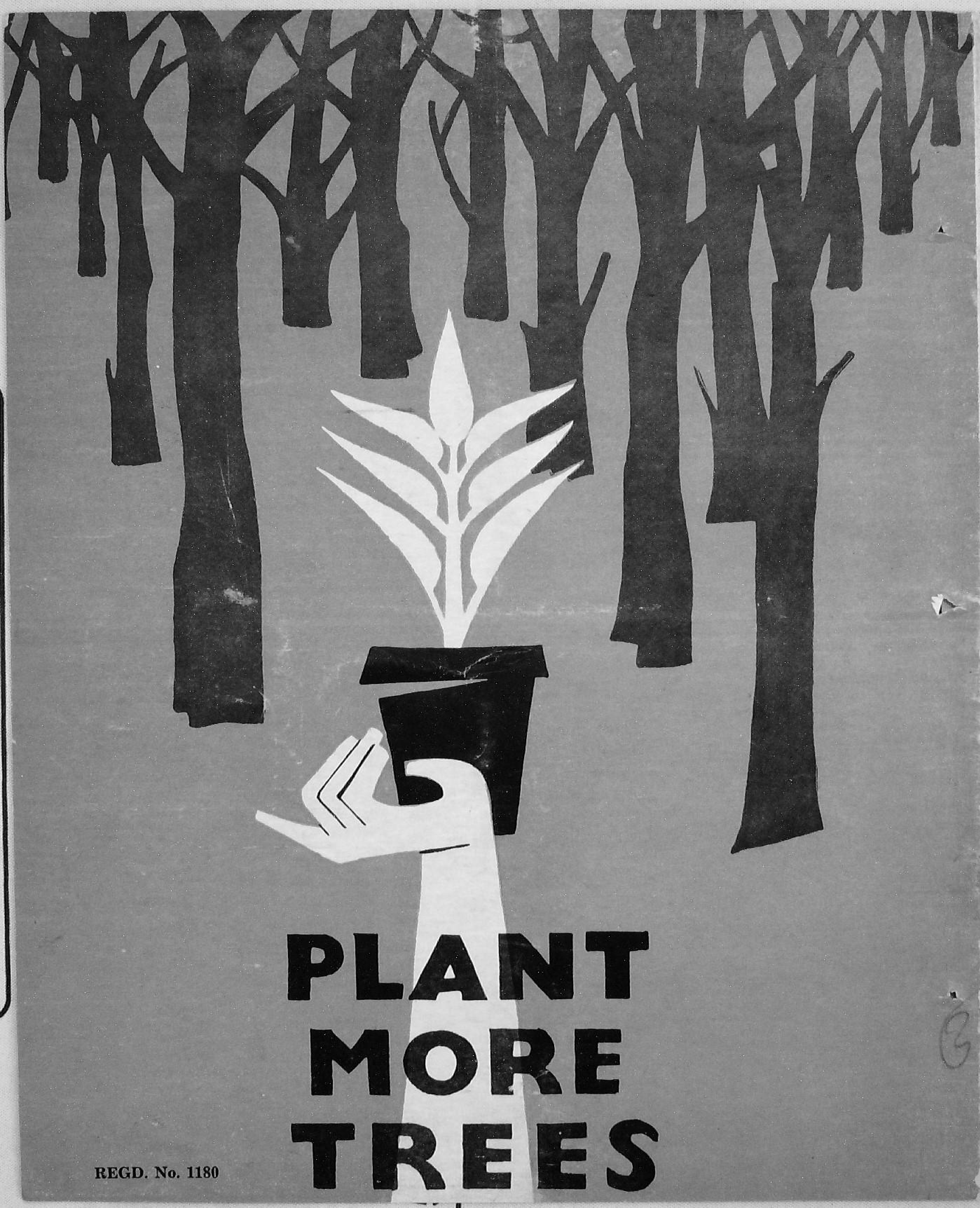

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